HITACHI

MODEL V-151F/V-152F

OSCILLOSCOPE

SERVICE MANUAL

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Hitachi Denshi, Ltd.

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NOTICE

This Service Manual describes the most typical product of this model. If there are any specific differences between this Manual and the servicing unit, please contact Hitachi Denshi sales office in your area.

V-151F/V-152F

MODEL V-151F/V-152F
OSCILLOSCOPE
Service Manual

1. SPECIFICATIONS

CRT display	
Type	130BUB31
Acceleration Voltage	2 kV
Effective display area	8 x 10 div (1 div = 9.5 mm)
Vertical amplifier (Identical for both channels)	5 mV/div - 5 V/div
Sensitivity:	Calibrated in 10 steps (1-2-5 Sequence up to about 2.5 times on each position with Variable control) 1 mV - 1 V/div (using x5 GAIN)
Bandwidth	DC to 15 MHz $^{+1}_{-3}$ dB DC - 5 MHz $^{+1}_{-3}$ dB (using x5 GAIN)
Rise time	Typical 24 ns
Input impedance	1 MΩ shunted by 30 pF ±5 pF (direct)
Input coupling	AC, GND, DC
Max. input voltage	600 Vp-p, 300 V (DC + AC peak)
Input connector	BNC
CH1 output	
Output voltage*	20 mV/div Min.
Bandwidth*	50 Hz-5 MHz (-3dB)(at x1 GAIN)
Output noise*	10 mVp-p Max.

* Measured by 1 m 50 Ω BNC cable with 50 Ω terminator.

Output impeadance — Approx. 50 Ω

Output coupling — AC

Time base

Sweep speed — 0.2 μs - 0.2 s/DIV
19 step, 1-2-5 sequence

Magnification — x10 (max. speed 100 ns/div)

X-Y display

(V-151F: X = Ext. TRG or [X] IN, Y = INPUT)

Sensitivity — Y axis: 5 mV/div - 5 V/div
X axis: Approx. 0.2 V/div

Bandwidth — X axis: DC -500 kHz

X-Y phase — Less than 3 ° at 10 kHz

(V-152F: X = CH1, Y = CH2)

Sensitivity — Y axis: 5 mV/div - 5 V/div
X axis: 5 mV/div - 5 V/div

Bandwidth — X axis: DC - 500 kHz

X-Y phase — Less than 3 ° at 10 kHz

Synchronization

Trigger sensitivity

Frequency	INT. trig	EXT. trig
20 Hz - 2 MHz	0.5 div	200 mV
2 MHz - 15 MHz	1.5 div	800 mV

Vertical MODE (V-152F)

MODE; CH1, CH2 (X-Y), DUAL, ADD, DIFF
DUAL: DUAL trace display
ADD: CH1 and CH2 are added
DIFF: CH2 and CH2 (inverted signal) are added

Trigger MODE

AUTOmatic	:	Sweep free-runs.
NORMAL	:	Sweep runs when triggered.
TV(+), TV(-)	:	Extracts the synchronizing signal from composite video signal and provides stable synchronization. Slope switch is selected according to polarity of video signals.

SOURCE; INTernal (V-152F; CH1 or CH2) or EXTernal or LINE.

Calibration

Waveform	Square wave 1 kHz ±10 % (typ)
Voltage	0.5 Vp-p ±3 %
Power supply	AC 100/120/220/240V
size and weight	190(H) x 275(W) x 400(D) mm approx. 8.5 kg [7.5(H) x 10.8(W) x 15.7(D)in 18.7 lbs]

2. COMPOSITION

(1) V-151F, V-152F oscilloscope 1
(2) AT-10AB1.5 probe ..... 1 (V-151F), 2(V-152F)
(3) Operation manual 1
(4) Power supply cord 1

3. PREVENTIVE MAINTENANCE

Preventive maintenance, when performed on a regular basis, can prevent instrument breakdown and may improve the reliability of the oscilloscope. The severity of environment to which this instrument is subjected will determine the frequency of maintenance. A convenient time to perform preventive maintenance is preceding recalibration of the instrument.

Disassembly

Remove the 6 screws in the top cover of the instrument. Gently separate the top cover from the instrument and lay aside. Most of the internal parts of the instrument are now accessible.

If access to the front of the Input circuit board is necessary, remove the knobs from all of the external control shafts. Remove the two screws securing the side panel to the Input circuit board and remove the instrument side panel. (See 8. Exploded View)

Cleaning

The instrument should be cleaned as often as operating conditions require. Accumulation of dirt in the instrument can cause component breakdown.

The covers provide protection against dust in the interior of the instrument. Loose dust accumulated on these covers can be removed with a soft cloth or small brush.

Dirt that remains can be removed with a soft cloth dampened in a mild detergent and water solution. Abrasive cleaners should not be used.

Cleaning the interior should only be occasionally necessary. The best way to clean the interior is to blow off the dust with a dry, low-velocity stream of air. A soft-bristle brush or a cotton-tipped applicator is useful for cleaning in narrow spaces or for cleaning more delicate components.

Visual Inspection

The instrument should be inspected occasionally for such defects as

broken connections, improperly seated transistors, damaged circuit boards, and heat-damaged parts. The corrective procedure for most visible defects is apparant; however, particular care must be taken if heat-damaged components are found. Overheating usually indicates other trouble in the instrument; therefore, correcting the cause of the overheating is important to prevent recurrance of the damage.

4. CALIBRATION

Hitachi Denshi, Ltd. provides complete instrument repair and recalibration at our oversea's office, and authorized dealer. Contact your local Hitachi Denshi, Ltd. office or representative.

4. 1 Test equipment required

The following test equipment and accessories, or equivalent, are required for the complete calibration of the V-151F, 152F. The given specifications for the test equipment are the minimum necessary for accurate calibration. Therefore, the specifications of any test equipment used must meet or exceed the listed specifications. All the test equipment is assumed to be correctly calibrated and operating within the listed specification. Operating instructions for the test equipment are not given in this procedure. Refer to the instruction manual for the test equipment if more information is needed.

Table 4-1

TEST EQUIPMENT REQUIRED

Description	Minimum Specification	Usage	Examples of Applicable Test Equipment
1. Constant Amplitude Signal Generator	50 kHz reference frequency; maximum frequency 40 MHz; variable amplitude	Check horizontal, vertical and trigger bandwidth.	
2. Standard Amplitude Calibrator	Amplitude accuracy: 0.25 % variable amplitude; 5 mV to 40 V; frequency: 1 kHz square wave	Check horizontal and vertical gain.	
3. Square-wave Generator	Variable frequency: 10 Hz to 1 MHz; output amplitude; 10 mV to 100 V	Check probe and vertical compensation.	
4. Digital Multimeter	0.1 % accuracy	Check power supply.	
5. Time Mark Generator	0.1 % accuracy	Check horizontal timing.	
6. Cable	Impedance, 50 ohms; type, RG-58/U; length, 42 inches, connectors, BNC .	External trigger operation check. Horizontal gain check and adjustment.	Hitachi Part No.4202
7. Termination	Impedance, 50 ohms; connectors, BNC.	Vertical Amplifier compensation checks and adjustment.	
8. Attenuator	Ratio, 10X; connectors, BNC; impedance, 50 ohms	Vertical Amplifier bandwidth check.	
9. T-Connector	Connectors, BNC .	External trigger operation checks.	Hitachi Part No.1301

4. 2 Preliminary procedure

This instrument should be calibrated at an ambient temperature of +20 °C (±5 °C) for best overall accuracy.

1. Connect the instrument to AC line voltage, 50/60 Hz line source.
2. Set the instrument controls as given in the Preliminary Control Settings. Allow at least fifteen minutes of warmup before proceeding.
3. See the Adjustment Locations in the pullout pages.

4. 3 Preliminary contorl settings

Preset the instrument controls to the settings given below, when starting the calibration procedures.

Table 4-2
PRELIMINARY CONTROL SETTING

	V-151F	V-152F
FOCUS	Midposition	Midposition
TRACE ROTATION	Midposition	Midposition
V. POSITION	Midposition, push in	Midposition, push in
V. VARIABLE	CAL , full clockwise	CAL, full clockwise
AC-GND-DC	GND	GND
VOLTS/DIV		
V. MODE		CH1
TIME/DIV	1 ms	1 ms
SWP or [X] VAR SWP VAR	CAL, fully clockwise	CAL, fully clockwise
H. POSITION	Midposition, push in	Midposition, push in
Trig. LEVEL	Midposition, push in	Midposition, push in
Trig. MODE	AUTO	AUTO
Trig. SOURCE	INT	CH1

4. 4 Initial starting procedure

1. Rotate POWER/INTENSITY control to the midposition.
2. Wait a few seconds for the cathode ray tube (CRT) to warm up. A trace should appear on the face of the CRT.
3. If no trace appears, increase (clockwise) the POWER/INTENSITY control setting until the trace is easily observed.
4. Adjust FOCUS control for the thinnest, sharpest trace.
5. Readjust POSITION controls if necessary, to center the trace.

POWER SUPPLY SYSTEM

NOTE

Before you begin, see ADJUSTMENT LOCATIONS in the pullout pages.

Control Settings

Preset the controls as given in the Preliminary Control Setting.

1. Check Low-voltage Supply, if necessary.
   a. Connect the digital voltmeter (DVM) from the +5 volt line.
      : +5 V ±5 % (IC1131)
   b. Connect the DVM from the +12 V line.
      : +12 V ±5 % (IC1111)
   c. Connect the DVM from the -12 V line.
      : -12 V ±5 % (IC1121)
   d. Connect the DVM from the +150 V.
      : +150 V ±5 %
2. Check/Adjust High Voltage Supply.
   a. Connect the DVM to the H.V test point.
   b. Check for a reading of 1900 V ±40 V.

c. Adjust the High Voltage adjustment RV1001 for nearly 1900 V.

3. Check/Adjust Grid Bias.

a. Rotate the POWER/INTENSITY to the 1/3 of fully way as shown.

b. Observe the trace of CRT.

c. Adjust Grid Bias Adjustment RV1021 for the trace makes an appear.

DISPLAY

Control Setting

Preset the controls as given in the Preliminary Control Setting.

4. Check/Adjust ASTIGmatism and FOCUS.

a. Set the TIME/DIV switch to the X-Y position, and Vertical MODE (in case of V-152F) switch to the CH2/ X-Y position.

b. Set the POWER/INTENSITY control for a small spot, near center of screen using position controls.

c. Check that the spot is round.

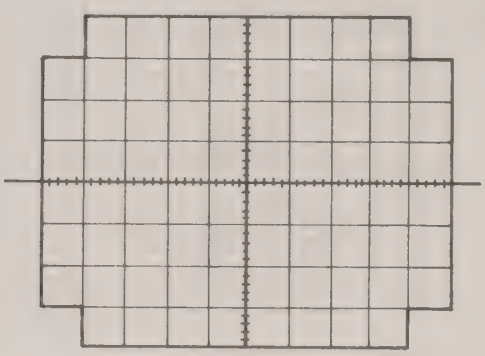
d. Adjust the FOCUS adjustment and the ASTIG adjustment RV1035 for a round spot.

5. Check/Adjust Trace Rotation.

a. Set the TIME/DIV switch to 1 ms.

b. Check that the trace is parallel to the center horizontal line.

c. Adjust TRACE ROTATION for a trace that is parallel with the horizontal graticule lines.



6. Check/Adjust GEOMetry.

a. Set the TIME/DIV switch to the 1 ms, and AC-GND-DC to DC.

b. Connect the Constant Amplitude Signal Generator to the input.

c. Set the VOLTS/DIV switch setting for a full-screen (8 division) deflection.

d. Check that horizontal bowing is less than $\pm$0.14 division.

e. Adjust the GEOM adjustment RV1034 for a display that is parallel with top and bottom horizontal lines.

Note;

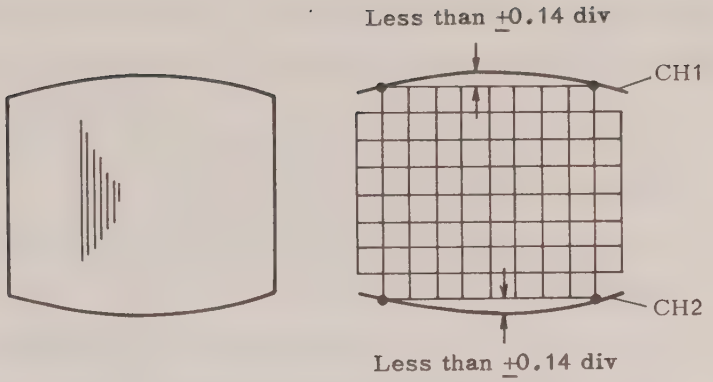
For the V-152F, also it is possible the adjustment of GEOM as follow.

a. Set the vertical MODE to the DUAL.

b. Rotate the POSITION (CH1) control to the top the trace.

c. Rotate the POSITION (CH2) control to the bottom the trace.

d. Check and Adjust as before methode.



VERTICAL SYSTEM

Control Setting

Preset the controls as given in the Preliminary Control Settings.

7. Check/Adjust DC Balance (Step attenuator balance).
   a. Set the VOLTS/DIV switch to the 5 mV position.
   b. Position the trace to the horizontal center line.
   c. Change the VOLTS/DIV switch to the 10 mV position.
   d. Check that the trace is within 0.2 division of the center horizontal line.
   e. Adjust the DC BAL adjustment, RV11 (CH1) or RV111 (CH2), for a trace at the horizontal center line.
   f. Repeat part (a) through (e) until less than 0.2 division shift is noted when changing the VOLTS/DIV setting.
8. Check/Adjust Vertical Position Center.
   a. Confirm the vertical POSITION control at the midposition.
   b. Check the trace is within 1 division.
   c. Adjust the Position Center adjustment RV44 (CH1), RV144 (CH2) for a trace at the horizontal center line.

9. Check/Adjust x5 AC GAIN.

   a. Set the TIME/DIV switch to the 1 ms position.

   b. Set the VOLTS/DIV switch to the 5 mV position.

   c. Pull the vertical POSITION/ x5 GAIN out.

   d. Connect the Square-wave Generator (using 1 kHz out put range).

   e. Adjust the output amplitude of that generator for more than 4 division deflection of screen.

   f. Check the high-voltage level of pulse is flat.

   g. Adjust the x5 AC GAIN RV16 (CH1), RV116 (CH2) adjustment for a flat level.

10. Check/Adjust x1 AC GAIN.

   a. Push the vertical POSITION switch in.

   b. Refer item 9 part (a) through (f) (except (c)).

   c. Adjust the x1AC GAIN RV18 (CH1), RV118 (CH2) adjustment for a flat level.

11. Check/Adjust Vertical Gain.

   a. Set the VOLTS/DIV switch to the 5 mV position and AC-GND-DC switch to DC.

   b. Connect the standard amplitude calibrator to the input.

   c. Set the standard amplitude calibrator for a 20 mVp-p (4 divisions of display) signal.

d. Check for a display of four divisions.

e. Adjust RV43 (CH1), RV143 (CH2) for a display of 4 divisions within 5 %.

f. Check all the VOLTS/DIV switch settings.

12. Check/Adjust CAL Terminal (0.5 Vp-p).

a. Set the VOLTS/DIV switch to the 0.1 V position.

b. Connect the CAL to the input.

c. Check for a display of five divisions.

d. Adjust RV1203 for a display of 5 divisions within 5 %.

13. Check/Adjust Attenuation Compensation.

a. Set the VOLTS/DIV switch to the 0.1 V position and AC-GND-DC switch to DC.

b. Connect the square-wave generator to the input for a 0.5 V signal.

c. Check for a square wave that is flat (flat top).

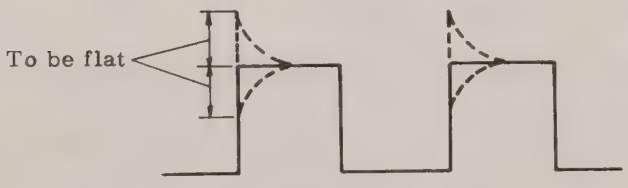
d. Adjust CV2 (CH1), CV102 (CH2) for a square wave that is flat (flat top).

e. Set the VOLTS/DIV switch to the 1 V position.

f. Set the square-wave generator for a 5 V signal.

g. Check for a square wave that is flat.

h. Adjust CV4 (CH1), CV104 (CH2) for a square wave that is flat.



14. Check/Adjust Probe Compensation.

a. Set the VOLTS/DIV switch to the 5 mV position.

b. Connect the square-wave generator to the input. Use a probe AT-10AB1.5.

c. Set the square-wave generator for a 0.2 V signal.

d. Adjust the LEVEL control for a stable display, triggered on the positive excursion of the waveform.

e. Check that positive excursion of the displayed square wave is flat (flat top).

f. Adjust the trimmer capacitance of that probe (in figure) the display is flat.

g. Set the VOLTS/DIV switch to the 0.1 V position.

h. Set the square-wave generator for a 5 V signal.

i. Check for a square wave that is flat.

j. Adjust CV1 (CH1), CV101 (CH2) for a square wave that is flat.

k. Set the square-wave generator for a 50 V signal.

l. Check for a square wave that is flat.

m. Adjust CV3 (CH1), CV103 (CH2) for a square wave that is flat.

15. Check/Adjust Vertical Step Response.

a. Set the VOLT/DIV switch to the 5 mV position.

b. Set the TIME/DIV switch to the 5 μs position, if necessary, to the 2 μs position setting.

c. Pull the x10 MAG switch out for a magnified display.

d. Connect the fast-rise, positive output of the square-wave generator to input. Use a 50-ohm termination and cable.

e. Set the square-wave generator to 100 kHz. Adjust the square-wave generator output for a 4-divisions display.

f. Position the positive-going signal in the center of the graticule, with the top of the square wave visible.

g. Adjust CV330 and CV316 for a square wave that is flat.

(A slight readjustment of the CV316 might be necessary for a flat top with 0 - +8 % over-shoot.)

16. Check/Adjust Vertical Bandwidth.

a. Set the VOLTS/DIV switch to 5 mV, the TIME/DIV switch to 1 ms and x1 GAIN.

b. Connect the constant amplitude signal generator to the input. Use a 50-ohm termination.

c. Set the constant amplitude signal generator to 50 kHz, and adjust the output amplitude of it for a deflection of four divisions.

d. Adjust the frequency of the constant amplitude signal generator until 2.8 divisions of deflection are present on the CRT screen.

e. Check that the frequency of the constant amplitude signal generator is greater than 15 MHz.

f. Adjust item 15 for deflection of at least 2.8 divisions at 15 MHz. Check display for a clean step response.

SWEEP TRIGGER

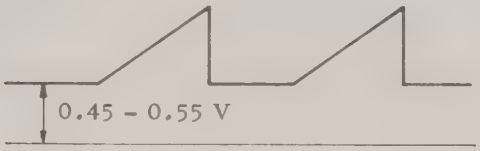
Control Settings

Preset the controls as given in the preliminary control settings.

17. Check/Adjust the Sweep Start.

a. Check the voltage in TR502, collector for a +0.45 V ~ +0.55 V.

b. Adjust the RV504 for a +0.45 V - 0.55 V at that point.



HORIZONTAL SYSTEM

Control Settings

Preset the controls as given in the preliminary control settings.

18. Check/Adjust Horizontal Gain (Sweep Cal.).

a. Set the TIME/DIV switch to the 1 ms.

b. Set the horizontal gain for a x1 MAG.

c. Set the input AC-GND-DC to DC.

d. Connect the cable to the output of the time mark generator.

e. Set the time mark generator for 1 ms time marks.

f. Check that the time marks align with the graticule lines over the center eight divisions.

g. Adjust RV812 at that the time marks align with the center eight graticule lines.

h. Check all other ranges of timing within 5 %. Use appropriate settings on the time mark generator.

i. Set x10 MAG (Pull out).

j. Adjust RV816 for one-cycle time marks align with the ten-divisions graticule lines.

19. X-Y Operation

19-1 Check/Adjust X Position Center.

-V-151F-

a. Set the TIME/DIV switch to [X-Y] position; the horizontal

POSITION control to midposition.

-V-152F-

a. Set the TIME/DIV switch to [X-Y] position, the vertical MODE switch to CH2/[X-Y] position and the horizontal POSITION control to midposition.

c. Check a round spot for the center graticule within/division against horizontal line.

d. Adjust RV806 the spot for the center.

19-2. Check/Adjust X Gain.

-V-151F-

a. Set the AC-GND-DC switch to GND.

b. Set the TIME/DIV switch to [X-Y].

c. Connect the standard amplitude calibrator to the EXT TRIG or [X] in.

d. Set the standard amplitude calibrator for a 1 Vp-p.

e. Check for a display of five divisions.

f. Adjust RV273 for a display of 5 divisions.

-V-152F-

a. Set the TIME/DIV switch to [X-Y].

b. Set the AC-GND-DC switch of CH1 to DC, the AC-GND-DC switch of CH2 to GND.

c. Set the VOLTS/DIV switch to the 5 mV position, with 1 GAIN.

d. Connect the standard amplitude calibrator to the CH1 input.

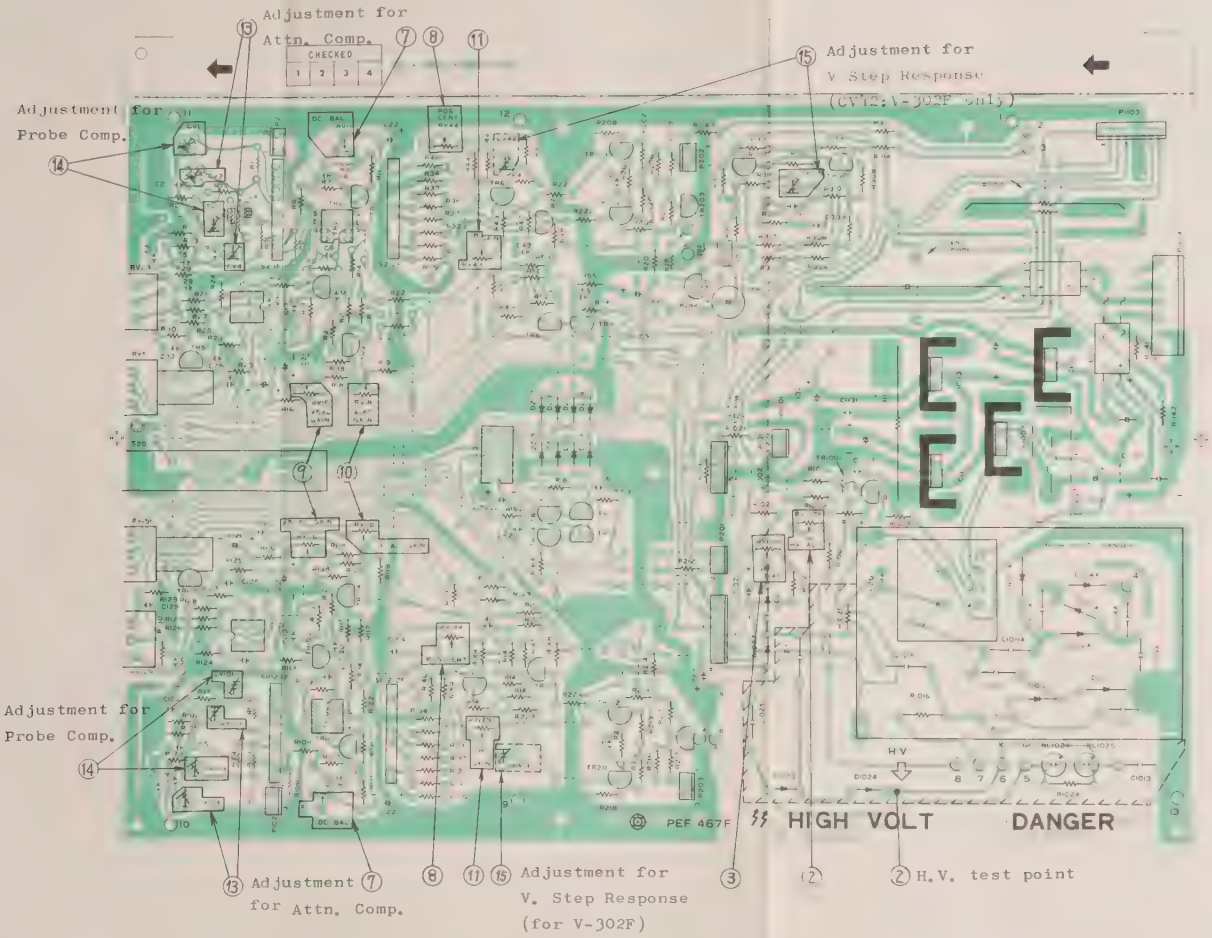
e. Set the standard amplitude calibrator for a 20 mV.

f. Check for a display of 4 divisions.

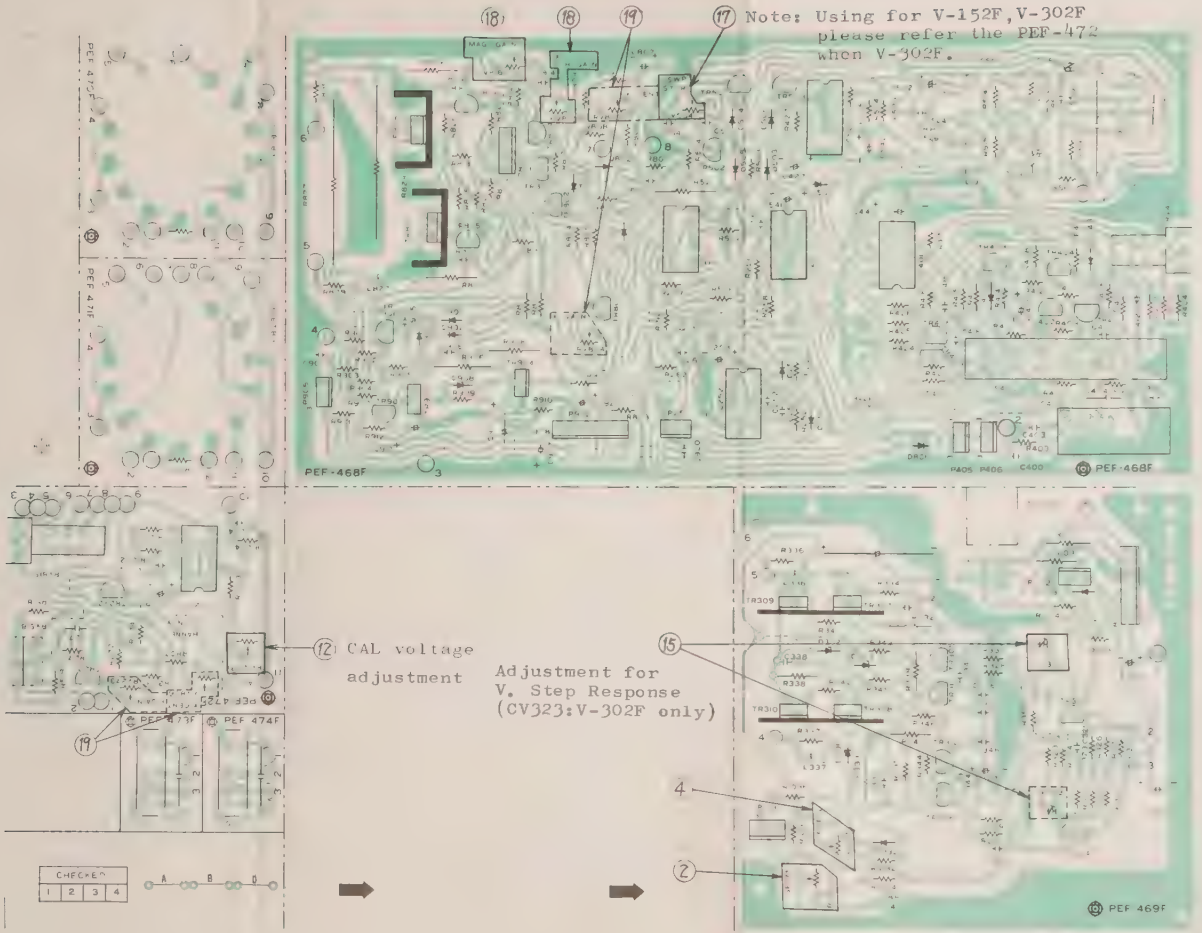
g. Adjust RV804 for a display of four divisions.

5. ELECTRICAL PARTS ARRANGEMENT
(with Adjustment Locations)

PEF-467F PCB



PEF-468F PCB


(18)
(18)
(19)
(17) Note: Using for V-152F, V-302F please refer the PEF-472 when V-302F.
PEF-468F
(12) CAL voltage adjustment
(19)
Adjustment for V. Step Response (CV323:V-302F only)
(15)
4
(2)
PEF 469F

6. ELECTRICAL PARTS LIST

PEF-467F PCB

Part Code	Symbol	Description	Qty 151F	152F	302F
CVE0025	CV1	C,Variable ECV-1ZW10x60		1	1
CCC1025	C2	C,Ceramic 50V 100 pF ±10%		1	1
CVE0025	CV2	C,Variable ECV-1ZW10x60		1	1
CVE0025	CV3	C,Variable ECV-1ZW10x60		1	1
CCC1002	C4	C,Ceramic 50V 10pF ±0.5pF		1	1
CVE0025	CV4	C,Variable ECV-1ZW10x60		1	1
CCC1365	C5	C,Ceramic 50V 680 pF ±5%		1	1
CCD0287	C8	C,Ceramic 500V 4700 pF +100-0%		1	1
CCC1029	C9	C,Ceramic 50V 1000 pF +80 -20%		1	1
CQA0097	C13	C,Plastic 50V 10000 pF ±10%		1	1
CCC0997	C16	C,Ceramic 50V 3 pF ±0.25pF		1	1
CCC1013	C20	C,Ceramic 50V 39 pF ±5%			1
CEC0175	C21	C,AL Elyc 25V 10μF		1	1
CEC0175	C22	C,AL Elyc 25V 10μF		1	1
CCC1025	C23	C,Ceramic 50V 100 pF ±10%		1	1
CCC1029	C25	C,Ceramic 50V 1000 pF +80 -20%		1	1
CEC0175	C26	C,AL Elyc 25V 10μF		1	1
CCC1002	C30	C,Ceramic 50V 10pF ±0.5pF			1
CVE0027	CV42	C,Variable ECV-1ZW40x60			1
CCC1011	C47	C,Ceramic 50V 33 pF ±5%			1
CCC1029	C55	C,Ceramic 50V 1000 pF +80 -20%		1	1
CEC0175	C66	C,AL Elyc 25V 10μF		1	1
CEC0175	C67	C,AL Elyc 25V 10μF	1	1	1
CQA0091	C73	C,Plastic 50V 1000 pF ±10%		1	1
CVE0025	CV101	C,Variable ECV-1ZW10x60	1	1	1
CCC1025	C102	C,Ceramic 50V 100 pF ±10%	1	1	1
CVE0025	CV102	C,Variable ECV-1ZW10x60	1	1	1
CVE0025	CV103	C,Variable ECV-1ZW10x60	1	1	1
CCC1002	C104	C,Ceramic 50V 10pF ±0.5pF	1	1	1
CVE0025	CV104	C,Variable ECV-1ZW10x60	1	1	1
CCC1365	C105	C,Ceramic 50V 680 pF ±5%	1	1	1
CCD0287	C108	C,Ceramic 500V 4700 pF +100-0%	1	1	1
CCC1029	C109	C,Ceramic 50V 1000 pF +80 -20%	1	1	1
CQA0097	C113	C,Plastic 50V 10000 pF ±10%	1	1	1
CCC1133	C116	C,Ceramic 50V 1 pF ±0.25pF	1	1	1
CCC1011	C120	C,Ceramic 50V 33 pF ±5%			1
CEC0175	C121	C,AL Elyc 25V 10μF	1	1	1
CEC0175	C122	C,AL Elyc 25V 10μF	1	1	1
CCC1025	C123	C,Ceramic 50V 100 pF ±10%	1	1	1
CCC1029	C125	C,Ceramic 50V 1000 pF +80 -20%	1	1	1
CEC0175	C126	C,AL Elyc 25V 10μF	1	1	1
CCC1002	C130	C,Ceramic 50V 10pF ±0.5pF			1
CVE0027	CV142	C,Variable ECV-1ZW40x60	1	1	1
CCC1034	C142	C,Ceramic 50V 68 pF ±5%			
CCC1011	C147	C,Ceramic 50V 33 pF ±5%			1
CCC0999	C154	C,Ceramic 50V 5 pF ±0.25pF	1	1	1
CCC1029	C161	C,Ceramic 50V 1000 pF +80 -20%		1	1
CCC1029	C162	C,Ceramic 50V 1000 pF +80 -20%	1	1	1
CQA0091	C173	C,Plastic 50V 1000 pF ±10%	1	1	1
CCC1025	C282	C,Ceramic 50V 100 pF ±10%	1	1	1

Part Code	Symbol	Description	Qty 151F	152F	302F
CES0033	C284	C,AL Elyc 16V 100μF	1	1	1
HTA0024	TR281	Transistor 2SA1029D	1	1	1
JBX0468	P281	Connector 171825-3	1	1	1
CCC1027	C309	C,Ceramic 50V 220 pF ±10%	1	1	
CQA0097	C309	C,Plastic 50V 10000 pF ±10%			1
CCC1007	C310	C,Ceramic 50V 22 pF ±5%			1
CCC1002	C310	C,Ceramic 50V 10pF ±0.5pF	1	1	
CVE0026	CV316	C,Variable ECV-1ZW20x60	1	1	1
CES0033	C1001	C,AL Elyc 25V 100μF	1	1	1
CQA0018	C1002	C,Plastic 50V 0.33μF ±10%	1	1	1
CQA0101	C1005	C,Plastic 50V 47000 pF ±10%	1	1	1
CCD0247	C1011	C,Ceramic 2kV 2200 pF ±10%	1	1	1
CCD0231	C1012	C,Ceramic 2000V 4700 pF +80 -20%	1	1	1
CCD0231	C1013	C,Ceramic 2000V 4700 pF +80 -20%	1	1	1
CCD0247	C1011A	C,Ceramic 2kV 2200 pF ±10%			1
CCD0247	C1012A	C,Ceramic 2kV 2200 pF ±10%			1
CCD0247	C1013A	C,Ceramic 2kV 2200 pF ±10%			1
CCD0247	C1014A	C,Ceramic 2kV 2200 pF ±10%			1
CCD0246	C1016	C,Ceramic 2kV 1000 pF ±10%	1	1	1
CCD0286	C1020	C,Ceramic 500V 1000 pF +100-0%	1	1	1
CEC0213	C1021	C,AL Elyc 160V 1μF	1	1	1
CCD0247	C1023	C,Ceramic 2kV 2200 pF ±10%	1	1	1
CCD0231	C1025	C,Ceramic 2000V 4700 pF +80 -20%	1	1	1
CEC0142	C1101	C,AL Elyc 350V 47μF	1	1	
CEC0433	C1101	C,AL Elyc 250V 100μF			1
CEC0347	C1111	C,AL Elyc 25V 2200μF	1	1	1
CES0033	C1112	C,AL Elyc 25V 100μF	1	1	1
CEC0178	C1121	C,AL Elyc 25V 1000μF	1	1	1
CEC0033	C1122	C,AL Elyc 25V 100μF	1	1	1
CEC0175	C1131	C,AL Elyc 25V 10μF	1	1	1
CES0033	C1132	C,AL Elyc 25V 100μF	1	1	1
HDS0108	D201	Diode 1S2075 T-D		1	1
HDS0108	D202	Diode 1S2075 T-D		1	1
HDS0108	D203	Diode 1S2075 T-D		1	1
HDS0108	D204	Diode 1S2075 T-D		1	1
HDS0108	D211	Diode 1S2075 T-D		1	1
HDS0108	D212	Diode 1S2075 T-D		1	1
HDS0108	D213	Diode 1S2075 T-D	1	1	1
HDS0108	D214	Diode 1S2075 T-D	1	1	1
HDY0031	D1011	Diode Y10GA	1	1	1
HDY0031	D1012	Diode Y10GA	1	1	1
HDY0031	D1011A	Diode Y10GA			1
HDY0031	D1012A	Diode Y10GA			1
HDY0031	D1013A	Diode Y10GA			1
HDY0031	D1014A	Diode Y10GA			1
HDS0250	D1021	Diode 1SS83	1	1	1
HDS0250	D1022	Diode 1SS83	1	1	1
HDY0031	D1023	Diode Y10GA	1	1	1
HDY0031	D1024	Diode Y10GA	1	1	1
HDM0034	D1101	Diode Stack M4G-1	1	1	1
HDM0033	D1111	Diode Stack M4C-1	1	1	1
EFG0347	F1001	Fuse MF61NM 1-2 (0.5A 250V)JIS	1	1	1
ILH0088	IC1	Analog IC HA17741PS		1	1
ILH0088	IC101	Analog IC HA17741PS	1	1	1
IDH0586	IC201	Digital IC HD74LS74AP		1	1
HX8338426-B	IC1111	Digital IC HA17812P	1	1	
ILM0327	IC1121	Analog IC MPC7912H	1		1
HX8338426-A	IC1131	Digital IC HA17805P	1	1	1

Part Code	Symbol	Description	Qty 151F	152F	302F
TLL0084	L4	Coil EL0606R-1R0M			1
ELL0019	NL1024	Lamp NE-2	1	1	1
ELL0019	NL1025	Lamp NE-2	1	1	1
JBX0468	P2	Connector 171825-3		1	1
JBX0468	P102	Connector 171825-3	1	1	1
JBX0468	P201	Connector 171825-3		1	1
JBX0468	P202	Connector 171825-3	1	1	1
JBX0468	P203	Connector 171825-3	1	1	1
HX116412-B	PEF-467	PCB PEF-467B	1	1	1
JBX0468	P1001	Connector 171825-3	1	1	1
JBX0470	P1002	Connector 171825-6	1	1	1
JBX0467	P1102	Connector 171825-8	1	1	1
JBX0467	P1103	Connector 171825-8	1	1	1
JBX1881	P1104	Connector 1-171825-2 (12P)	1	1	1
RME0978	R1	R, Metal 1/2W 909kΩ ±1%		1	1
RME0740	R2	R, Metal 1/4W 113kΩ ±1%		1	1
RME0813	R3	R, Metal 1/2W 990kΩ ±0.5%		1	1
RCR3028	R4	R, Carbon 1/4W 100Ω ±5%		1	
RCR3050	R4	R, Carbon 1/4W 820Ω ±5%			1
RME0676	R5	R, Metal 1/4W 10.0kΩ ±1%		1	1
RME0977	R6	R, Metal 1/2W 1MΩ ±1%		1	1
RCR3102	R7	R, Carbon 1/4W 220kΩ ±5%		1	1
RCR3036	R8	R, Carbon 1/4W 220Ω ±5%		1	1
RME0660	R9	R, Metal 1/4W 475Ω ±1%		1	1
RME0733	R10	R, Metal 1/4W 412Ω ±1%		1	1
RNX0258	RV11	VR,Metal POT1102T-1-201		1	1
RCR3068	R12	R,Carbon 1/4W 4.7kΩ ±5%		1	1
RCR3056	R13	R,Carbon 1/4W 1.5kΩ ±5%		1	1
RCR3064	R14	R,Carbon 1/4W 3.3kΩ ±5%		1	1
RCR3032	R15	R,Carbon 1/4W 150Ω ±5%		1	1
RCR3060	R16	R,Carbon 1/4W 2.2kΩ ±5%		1	1
RDE0010	RV16	VR,Carbon EVL-S0AA00B52		1	1
HX8311711				R	R
HX8311704				R	R
RCR3064	R17	R,Carbon 1/4W 3.3kΩ ±5%		1	1
RCR3060	R18	R,Carbon 1/4W 2.2kΩ ±5%		1	1
RDE0012	RV18	VR,Carbon EVL-S0AA00B22		1	1
HX8311711				R	R
HX8311704				R	R
RCR3046	R19	R,Carbon 1/4W 560Ω ±5%		1	1
RCR3012	R20	R,Carbon 1/4W 22Ω ±5%			1
RCR3012	R21	R,Carbon 1/4W 22Ω ±5%		1	1
RCR3012	R22	R,Carbon 1/4W 22Ω ±5%		1	1
RCR3084	R23	R,Carbon 1/4W 22kΩ ±5%		1	1
RME0729	R24	R,Metal 1/4W 6.19kΩ ±1%		1	1
RCR3044	R25	R,Carbon 1/4W 470Ω ±5%		1	1
RCR3056	R26	R,Carbon 1/4W 1.5kΩ ±5%		1	1
RME0734	R27	R,Metal 1/4W 71.5kΩ ±1%		1	1
RME0735	R28	R,Metal 1/4W 10.7kΩ ±1%		1	1
RCR3048	R29	R,Carbon 1/4W 680Ω ±5%		1	1
HX3142131-A	RV29	VR,Carbon V16L4-N20KC B 1kΩ		1	1
RCR3052	R30	R,Carbon 1/4W 1.0kΩ ±5%		1	1
RME0736	R31	R,Metal 1/4W 240Ω ±1%		1	1
RME0726	R32	R,Metal 1/4W 120Ω ±1%		1	1
RME0737	R33	R,Metal 1/4W 71.5Ω ±1%		1	1
RME0618	R34	R,Metal 1/4W 47.5Ω ±1%		1	1
RCR3030	R35	R,Carbon 1/4W 120Ω ±5%		1	1
RCR3016	R36	R,Carbon 1/4W 33Ω ±5%		1	1
RCR3025	R37	R,Carbon 1/4W 75Ω ±5%		1	1
RCR3020	R38	R,Carbon 1/4W 47Ω ±5%		1	1
RCR3076	R40	R,Carbon 1/4W 10kΩ ±5%		1	1

Part Code	Symbol	Description	Qty 151F	152F	302F
RCR3032	R41	R,Carbon 1/4W 150Ω ±5%		1	
RCR3038	R41	R,Carbon 1/4W 270Ω ±5%			1
RCR3012	R42	R,Carbon 1/4W 22Ω ±5%			1
RCR3024	R43	R,Carbon 1/4W 68Ω ±5%			1
RCR3026	R43	R,Carbon 1/4W 82Ω ±5%		1	
RDE0012	RV43	VR,Carbon EVL-S0AA00B22		1	1
HX8311711				R	R
HX8311704				R	R
RCR3062	R44	R,Carbon 1/4W 2.7kΩ ±5%		1	1
RDE0015	RV44	VR,Carbon EVL-S0AA00B23		1	1
HX8311711				R	R
HX8311704				R	R
RCR3062	R45	R,Carbon 1/4W 2.7kΩ ±5%		1	1
RCR3040	R47	R,Carbon 1/4W 330Ω ±5%		1	1
RCR3040	R48	R,Carbon 1/4W 330Ω ±5%		1	1
RCR3028	R49	R,Carbon 1/4W 100Ω ±5%		1	1
RCR3028	R50	R,Carbon 1/4W 100Ω ±5%		1	1
RCR3060	R51	R,Carbon 1/4W 2.2kΩ ±5%		1	1
RDE0013	RV51	VR,Carbon EVH-YK3325B13		1	1
HX8311705				R	R
HX8311701				R	R
RME0727	R52	R,Metal 1/4W 1.15kΩ ±1%		1	1
RME0727	R53	R,Metal 1/4W 1.15kΩ ±1%		1	1
RCR3044	R54	R,Carbon 1/4W 470Ω ±5%		1	1
RCR3060	R55	R,Carbon 1/4W 2.2kΩ ±5%		1	1
RCR3018	R72	R,Carbon 1/4W 39Ω ±5%		1	1
RCR3003	R73	R,Carbon 1/4W 6.8Ω ±5%		1	1
RME0978	R101	R,Metal 1/2W 909kΩ ±1%	1	1	1
RME0740	R102	R,Metal 1/4W 113kΩ ±1%	1	1	1
RME0813	R103	R,Metal 1/2W 990kΩ ±0.5%	1	1	1
RCR3028	R104	R,Carbon 1/4W 100Ω ±5%	1	1	1
RME0676	R105	R,Metal 1/4W 10.0kΩ ±1%	1	1	1
RME0977	R106	R,Metal 1/2W 1MΩ ±1%	1	1	1
RCR3102	R107	R,Carbon 1/4W 220kΩ ±5%	1	1	1
RCR3036	R108	R,Carbon 1/4W 220Ω ±5%	1	1	1
RME0660	R109	R,Metal 1/4W 475Ω ±1%	1	1	1
RME0733	R110	R,Metal 1/4W 412Ω ±1%	1	1	1
RNX0258	RV111	VR,Metal POT1102T-1-201	1	1	1
RCR3068	R112	R,Carbon 1/4W 4.7kΩ ±5%	1	1	1
RCR3056	R113	R,Carbon 1/4W 1.5kΩ ±5%	1	1	1
RCR3064	R114	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1
RCR3032	R115	R,Carbon 1/4W 150Ω ±5%	1	1	1
RCR3060	R116	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RDE0010	RV116	VR,Carbon EVL-S0AA00B52	1	1	1
HX8311711			R	R	R
HX8311704			R	R	R
RCR3064	R117	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1
RCR3060	R118	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RDE0012	RV118	VR,Carbon EVL-S0AA00B22	1	1	1
HX8311711			R	R	R
HX8311704			R	R	R
RCR3046	R119	R,Carbon 1/4W 560Ω ±5%	1	1	1
RCR3012	R120	R,Carbon 1/4W 22Ω ±5%			1
RCR3012	R121	R,Carbon 1/4W 22Ω ±5%	1	1	1
RCR3012	R122	R,Carbon 1/4W 22Ω ±5%	1	1	1
RCR3084	R123	R,Carbon 1/4W 22kΩ ±5%	1	1	1
RME0729	R124	R,Metal 1/4W 6.19kΩ ±1%	1	1	1
RCR3044	R125	R,Carbon 1/4W 470Ω ±5%	1	1	1
RCR3056	R126	R,Carbon 1/4W 1.5kΩ ±5%	1	1	1
RME0734	R127	R,Metal 1/4W 71.5kΩ ±1%	1	1	1
RME0735	R128	R,Metal 1/4W 10.7kΩ ±1%	1	1	1
RCR3048	R129	R,Carbon 1/4W 680Ω ±5%	1	1	1
HX3142131-A	RV129	VR,Carbon V16L4-N20KC B1kΩ	1	1	1

Part Code	Symbol	Description	Qty 151F	152F	302F
RCR3052	R130	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1
RME0736	R131	R,Metal 1/4W 240Ω ±1%	1	1	1
RME0726	R132	R,Metal 1/4W 120Ω ±1%	1	1	1
RME0737	R133	R,Metal 1/4W 71.5Ω ±1%	1	1	1
RME0648	R134	R,Metal 1/4W 47.5Ω ±1%	1	1	1
RCR3030	R135	R,Carbon 1/4W 120Ω ±5%	1	1	1
RCR3016	R136	R,Carbon 1/4W 33Ω ±5%	1	1	1
RCR3025	R137	R,Carbon 1/4W 75Ω ±5%	1	1	1
RCR3020	R138	R,Carbon 1/4W 47Ω ±5%	1	1	1
RCR3076	R140	R,Carbon 1/4W 10kΩ ±5%	1	1	1
RCR3032	R141	R,Carbon 1/4W 150Ω ±5%	1	1	
RCR3038	R141	R,Carbon 1/4W 270Ω ±5%			1
RCR3012	R142	R,Carbon 1/4W 22Ω ±5%	1	1	1
RCR3024	R143	R,Carbon 1/4W 68Ω ±5%			1
RCR3026	R143	R,Carbon 1/4W 82Ω ±5%	1	1	
RDE0012	RV143	VR,Carbon EVL-S0AA00B22	1	1	1
HX8311711			R	R	R
HX8311704			R	R	R
RCR3062	R144	R,Carbon 1/4W 2.7kΩ	1	1	1
RDE0015	RV144	VR,Carbon EVL-S0AA00B23	1	1	1
HX8311711			R	R	R
HX8311704			R	R	R
RCR3062	R145	R,Carbon 1/4W 2.7kΩ ±5%	1	1	1
RCR3040	R147	R,Carbon 1/4W 330Ω ±5%	1	1	1
RCR3040	R148	R,Carbon 1/4W 330Ω ±5%	1	1	1
RCR3028	R149	R,Carbon 1/4W 100Ω ±5%	1	1	1
RCR3028	R150	R,Carbon 1/4W 100Ω ±5%	1	1	1
RCR3060	R151	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RDE0013	RV151	VR,Carbon EVH-YK3325B13	1	1	1
HX8311705			R	R	R
HX8311701			R	R	R
RME0727	R152	R,Metal 1/4W 1.15kΩ ±1%	1	1	1
RME0727	R153	R,Metal 1/4W 1.15kΩ ±1%	1	1	1
RCR3016	R154	R,Carbon 1/4W 33Ω ±5%	1	1	1
RCR3060	R161	R,Carbon 1/4W 2.2kΩ ±5%		1	1
RCR3060	R162	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RCR3044	R163	R,Carbon 1/4W 470Ω ±5%		1	1
RCR3044	R164	R,Carbon 1/4W 470Ω ±5%	1	1	1
RCR3018	R172	R,Carbon 1/4W 39Ω ±5%	1	1	1
RCR3003	R173	R,Carbon 1/4W 6.8Ω ±5%	1	1	1
RCR3040	R201	R,Carbon 1/4W 330Ω ±5%		1	1
RCR3061	R202	R,Carbon 1/4W 2.4kΩ ±5%		1	1
RCR3061	R203	R,Carbon 1/4W 2.4kΩ ±5%		1	1
RCR3060	R204	R,Carbon 1/4W 2.2kΩ ±5%		1	1
RCR3052	R205	R,Carbon 1/4W 1.0kΩ ±5%		1	1
RCR3048	R206	R,Carbon 1/4W 680Ω ±5%		1	1
RCR3020	R207	R,Carbon 1/4W 47Ω ±5%		1	1
RCR3028	R208	R,Carbon 1/4W 100Ω ±5%		1	1
RCR3036	R209	R,Carbon 1/4W 220Ω ±5%		1	1
RCR3040	R211	R,Carbon 1/4W 330Ω ±5%	1	1	1
RCR3061	R212	R,Carbon 1/4W 2.4kΩ ±5%	1	1	1
RCR3061	R213	R,Carbon 1/4W 2.4kΩ ±5%	1	1	1
RCR3060	R214	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RCR3052	R215	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1
RCR3048	R216	R,Carbon 1/4W 680Ω ±5%	1	1	1
RCR3020	R217	R,Carbon 1/4W 47Ω ±5%	1	1	1
RCR3028	R218	R,Carbon 1/4W 100Ω ±5%	1	1	1
RCR3036	R219	R,Carbon 1/4W 220Ω ±5%	1	1	1
RCR3032	R221	R,Carbon 1/4W 150Ω ±5%		1	1
RCR3032	R222	R,Carbon 1/4W 150Ω ±5%		1	1
RCR3032	R223	R,Carbon 1/4W 150Ω ±5%	1	1	1
RCR3032	R224	R,Carbon 1/4W 150Ω ±5%	1	1	1
RCR3044	R265	R,Carbon 1/4W 470Ω ±5%		1	1

Part Code	Symbol	Description	Qty 151F	152F	302F
RCR3040	R301	R,Carbon 1/4W 330Ω ±5%	1	1	1
RCR3044	R302	R,Carbon 1/4W 470Ω ±5%	1	1	1
RCR3064	R303	R,Carbon 1/4W 3.3kΩ ±5%		1	1
RCR3064	R304	R,Carbon 1/4W 3.3kΩ ±5%		1	1
RCR3060	R305	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RCR3060	R306	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RCR3040	R307	R,Carbon 1/4W 330Ω ±5%	1	1	1
RCR3044	R308	R,Carbon 1/4W 470Ω ±5%	1	1	1
RCR3090	R309	R,Carbon 1/4W 39kΩ ±5%	1	1	
RCR3096	R309	R,Carbon 1/4W 68kΩ ±5%			1
RCR3086	R310	R,Carbon 1/4W 27kΩ ±5%			1
RCR3020	R310	R,Carbon 1/4W 47kΩ ±5%	1	1	
RCR3056	R311	R,Carbon 1/4W 1.5kΩ ±5%	1	1	1
RCR3056	R312	R,Carbon 1/4W 1.5kΩ ±5%	1	1	1
RCR3027	R313	R,Carbon 1/4W 91Ω ±5%	1	1	1
RCR3027	R314	R,Carbon 1/4W 91Ω ±5%	1	1	1
RCR3153	R315	R,Carbon 1/2W 560Ω ±5%	1	1	1
RCR3044	R316	R,Carbon 1/4W 470Ω ±5%	1	1	
RCR3048	R316	R,Carbon 1/4W 680Ω ±5%			1
RME0687	R1001	R,Metal 1/4W 82.5kΩ ±1%	1	1	
RME0688	R1001	R,Metal 1/4W 100kΩ ±1%			1
RDE0017	RV1001	VR,Carbon EVL-S0AA00B54 50kΩ	1	1	1
HX8311711			R	R	R
HX8311704			R	R	R
RCR3102	R1002	R,Carbon 1/4W 220kΩ ±5%	1	1	1
RCR3076	R1003	R,Carbon 1/4W 10kΩ ±5%	1	1	1
RCR3060	R1004	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RCR3016	R1006	R,Carbon 1/4W 33Ω ±5%	1	1	1
RCR3076	R1011	R,Carbon 1/4W 10kΩ ±5%	1	1	1
RCR3476	R1016	R,Carbon 1/2W 1.8MΩ ±5%	1	1	
RMV0006	R1017	R,Metal 1/2W 12MΩ ±5%	1	1	
RMV0007	R1017	R,Metal 1/2W 9.1MΩ ±5%			1
RCR3480	R1016	R,Carbon 1/2W 2.7MΩ ±5%			1
RCR3426	R1020	R,Carbon 1/4W 390kΩ ±5%	1	1	1
RCR3092	R1021	R,Carbon 1/4W 47kΩ ±5%	1	1	
RDE0018	RV1021	VR,Carbon EVT-S0AA00B54	1	1	1
HX8311713			R	R	R
HX8311704			R	R	R
RCR3088	R1022	R,Carbon 1/4W 33kΩ ±5%	1	1	
RCR3078	R1022	R,Carbon 1/4W 12kΩ ±5%			1
RMV0004	R1024	R,Metal 1/2W 22.1MΩ ±1%	1	1	1
RCR3094	R1021	R,Carbon 1/4W 56kΩ ±5%			1
RCR3038	R1026	R,Carbon 1/4W 270Ω ±5%	1	1	1
RMR3229	R1102	R,Metal 5W 820Ω ±5%	1	1	
RCR3012	R1102	R,Carbon 1/4W 22Ω ±5%			1
RCR3052	R1111	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1
RMR2837	R1131	R,Metal 5W 47Ω ±5%	1	1	1
RCR3104	R1141	R,Carbon 1/4W 470kΩ ±5%	1	1	1
RCR3088	R1142	R,Carbon 1/4W 33kΩ ±5%	1	1	1
RCR3100	R1143	R,Carbon 1/4W 100kΩ ±5%	1	1	1
HX8311685	S2	SW,Rotary S21P2310		1	1
HX8311686				R	R
HX8311685	S102	SW,Rotary S21P2310	1	1	1
HX8311686			R	R	R
SSL0053	S201	SW,Lever SLA245		1	1
HTK0011	TR1	Transistor 2SK30AY		1	1
HTE0004	TR2	Transistor E412S-A			
HTM0074	TR2	Transistor MPA71A-L		1	1
HTC0557	TR3	Transistor 2SC1674K			1
HTC0148	TR3	Transistor 2SC458-C-		1	
HTC0557	TR4	Transistor 2SC1674K		1	1
HTC0148	TR5	Transistor 2SC458-C		1	1
HTC0664	TR6	Transistor 2SC1907		1	1

Part Code	Symbol	Description	Qty 151F	152F	302F
HTC0664	TR7	Transistor 2SC1907		1	1
HTA0105	TR8	Transistor 2SA836D		1	1
HTA0105	TR9	Transistor 2SA836D		1	1
HX841221	TR3	Core L1-RH0303		1	1
HX841221	TR4	Core L1-RH0303		1	1
HTK0011	TR101	Transistor 2SK30AY	1	1	1
HTE0004	TR102	Transistor E412S-A			
HTM0074	TR102	Transistor MPA71A-L	1	1	1
HTC0557	TR103	Transistor 2SC1674K			1
HTC0148	TR103	Transistor 2SC458-C	1	1	
HTC0557	TR104	Transistor 2SC1674K	1	1	1
HTC0148	TR105	Transistor 2SC458C	1	1	1
HTC0664	TR106	Transistor 2SC1907	1	1	1
HTC0664	TR107	Transistor 2SC1907	1	1	1
HX841221-A	TR103	Core L1-RH0303	1	1	1
HX841221-A	TR104	Core L1-RH0303	1	1	1
HTA0105	TR111	Transistor 2SA836D		1	1
HTA0105	TR112	Transistor 2SA836D		1	1
HTA0105	TR113	Transistor 2SA836D	1	1	1
HTA0105	TR114	Transistor 2SA836D	1	1	1
HTA0099	TR201	Transistor 2SA781K			1
HTA0099	TR202	Transistor 2SA781K			1
HTC0148	TR203	Transistor 2SC458C		1	1
HTA0105	TR201	Transistor 2SA836D		1	
HTA0105	TR202	Transistor 2SA836D		1	
HTA0099	TR211	Transistor 2SA781K			1
HTA0099	TR212	Transistor 2SA781K			1
HTC0148	TR213	Transistor 2SC458C	1	1	1
HTA0105	TR211	Transistor 2SA836D	1	1	
HTA0105	TR212	Transistor 2SA836D	1	1	
HTC0664	TR301	Transistor 2SC1907	1	1	1
HTC0664	TR302	Transistor 2SC1907	1	1	1
HX8311682	T1001	XFMR	1	1	1
HTC0322	TR1001	Transistor 2SC1707HC	1	1	1
HTA0105	TR1002	Transistor 2SA836D	1	1	1
HTC0032	TR1003	Transistor 2SC1061-C-	1	1	1
EFH0026	FH1001	Socket, Fus F-3265 1P PHENOLIC RESIN	1	1	1
CCC1027	C251	C,Ceramic 50V 220pF ±10%		1	1
CQA0091	C252	C,Plastic 50V 1000pF ±10%		1	1
CEC0175	C253	C,AL Elyc 25V 10μF		1	1
CCC1027	C256	C,Ceramic 50V 220pF ±10%		1	1
CCC1027	C261	C,Ceramic 50V 220pF ±10%			1
CCC1162	C261	C,Ceramic 50V 470pF ±10%		1	
CCC1030	C400	C,Ceramic 50V 10000pF +80% -20%	1	1	1
CCD0278	C403	C,Ceramic 500V 15pF ±5%	1	1	1
CQX0071	C404	C,Plastic 600V 22000pF ±10%	1	1	1
CCC1030	C405	C,Ceramic 50V 10000pF +80% -20%	1	1	1
CCC1029	C407	C,Ceramic 50V 1000pF +80% -20%	1	1	1
CET0031	C412	C,AL Elyc 50V 1μF NP	1	1	
CEA0033	C413	C,AL Elyc 25V 100μF	1	1	
CQA0097	C415	C,Plastic 50V 10000pF	1	1	1
CCC1007	C416	C,Ceramic 50V 22pF	1	1	1
CEC0175	C427	C,AL Elyc 25V 10μF	1	1	1
CEC0175	C441	C,AL Elyc 25V 10μF	1	1	1
CCC1030	C501	C,Ceramic 50V 10000pF	1	1	1
CCC1011	C505	C,Ceramic 50V 33pF ±5%	1	1	1
CCC1032	C510	C,Ceramic 50V 82pF ±5%	1	1	1
CVL1027	CV510	C,Variable ECV-1ZW10X60	1	1	1
HX8142077	C511	C,Plastic 100V 0.01μF ±1%	1	1	1
HX8142077	C512	C,Plastic 100V 0.01μF ±1%	1	1	1
CQA0090	C521	C,Plastic 50V 1000pF ±10%	1	1	1

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CEC0175	C525	C,AL Elyc 25V 10μF	1	1	1
CQA0103	C526	C,Plastic 50V 0.1μF ±10%	1	1	1
CEC0175	C541	C,AL Elyc 25V 10μF	1	1	1
CEC0175	C542	C,AL Elyc 25V 10μF	1	1	1
CCC1013	C801	C,Ceramic 50V 39pF ±5%	1	1	1
CEC0175	C807	C,AL Elyc 25V 10μF	1	1	1
CCC1030	C814	C,Ceramic 50V 10000pF +80% -20%	1	1	1
CQA0091	C817	C,Plastic 50V 1000pF ±10%	1	1	1
CCD0272	C823	C,Ceramic 500V 1pF ±0.25pF	1	1	1
CCD0272	C824	C,Ceramic 500V 1pF ±0.25pF	1	1	1
CCC1030	C903	C,Ceramic 50V 10000pF +80% -20%	1	1	1
CCC1014	C905	C,Ceramic 50V 47pF ±5%	1	1	1
CCD0272	C906	C,Ceramic 500V 1pF ±0.25pF	1	1	1
CEC0175	C907	C,AL Elyc 25V 10μF	1	1	1
CEC0219	C911	C,AL Elyc 250V 4.7μF	1	1	1
CEC0175	C912	C,AL Elyc 25V 10μF	1	1	1
CEC0175	C920	C,AL Elyc 25V 10μF			1
HDS0108	D251	Diode 1S2075 T-D		1	1
HDS0108	D252	Diode 1S2075 T-D		1	1
HDS0108	D413	Diode 1S2075 T-D	1	1	1
HDS0108	D431	Diode 1S2075 T-D	1	1	1
HDS0108	D501	Diode 1S2075 T-D	1	1	1
HDS0108	D502	Diode 1S2075 T-D	1	1	1
HDS0108	D503	Diode 1S2075 T-D	1	1	1
HDM0051	D504	Diode MA161	1	1	1
HDS0108	D505	Diode 1S2075 T-D	1	1	1
HDS0108	D506	Diode 1S2075 T-D	1	1	1
HDS0108	D801	Diode 1S2075 T-D		1	1
HDS0108	D802	Diode 1S2075 T-D	1	1	1
HDS0108	D803	Diode 1S2075 T-D	1	1	1
HDS0108	D901	Diode 1S2075 T-D	1	1	1
HDS0108	D902	Diode 1S2075 T-D		1	1
HDS0108	D903	Diode 1S2075 T-D	1	1	1
HDH0029	D908	Diode HZ5B T-D	1	1	1
IDH0646	IC251	Digital IC HD74LS02P		1	1
IDH0179	IC252	Digital IC HD7402P		1	1
IDH0177	IC401	Digital IC HD7400P	1	1	
IDH0402	IC401	Digital IC HD74S00			1
IDH0586	IC501	IC HD74LS74AP	1	1	
IDH0428	IC501	Digital IC HD74S74			1
IDH0323	IC502	Digital IC HD74123P	1	1	1
TLF0076	L261	Coil EL0606R-101K		1	1
TLF0021	L827	Coil FL7H 2.2μH ±5%			1
TLF0148	L827	Coil FL7H 6.8μH ±5%		1	
JBX0468	P251	Connector 171825-3		1	1
JBX0468	P405	Connector 171825-3	1	1	1
JBX0468	P406	Connector 171825-3	1	1	1
HX11643-B	PEF-468C	PCB PEF-468B - 474B	1	1	1
HX283858			0	0	0
HX8311790			0	0	0
JBX0454	P801	Connector 171825-5	1	1	1
JBX0467	P902	Connector 171825-5	1	1	1
JBX0468	P905	Connector 171825-3	1	1	1
RCR3038	R251	R,Carbon 1/4W 270Ω ±5%		1	1
RCR3060	R252	R,Carbon 1/4W 2.2kΩ ±5%		1	1
RCR3048	R256	R,Carbon 1/4W 1kΩ ±5%		1	1
RCR3086	R257	R,Carbon 1/4W 33Ω ±5%		1	1
RCR3080	R257	R,Carbon 1/4W 100Ω ±5%			1
RCR3056	R258	R,Carbon 1/4W 1kΩ ±5%		1	1
RCR3052	R261	R,Carbon 1/4W 1kΩ ±5%		1	1

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RCR3086	R262	R,Carbon 1/4W 27kΩ ±5%		1	1
RCR3050	R281	R,Carbon 1/4W 820Ω ±5%	1	1	1
RCR3036	R282	R,Carbon 1/4W 220Ω ±5%	1	1	1
RCR3052	R283	R,Carbon 1/4W 1.0Ω ±5%	1	1	1
RCR3018	R284	R,Carbon 1/4W 39Ω ±5%	1	1	1
RCR3082	R401	R,Carbon 1/4W 18kΩ ±5%	1	1	1
RCR3098	R402	R,Carbon 1/4W 82kΩ ±5%	1	1	1
RCR3104	R403	R,Carbon 1/4W 470kΩ ±5%	1	1	1
RCR3060	R404	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RCR3104	R405	R,Carbon 1/4W 470kΩ ±5%	1	1	1
RCR3076	R406	R,Carbon 1/4W 10kΩ ±5%	1	1	1
RCR3052	R407	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1
RCR3064	R408	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1
RCR3052	R409	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1
RCR3044	R410	R,Carbon 1/4W 470Ω ±5%	1	1	1
RCR3028	R411	R,Carbon 1/4W 100Ω ±5%	1	1	1
RCR3092	R412	R,Carbon 1/4W 47kΩ ±5%	1	1	1
RCR3064	R413	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1
RCR3076	R414	R,Carbon 1/4W 10kΩ ±5%	1	1	1
RCR3068	R415	R,Carbon 1/4W 4.7kΩ ±5%	1	1	1
RCR3086	R416	R,Carbon 1/4W 27kΩ ±5%	1	1	1
RCR3064	R417	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1
RCR3058	R421	R,Carbon 1/4W 1.8kΩ ±5%	1	1	1
RCR3064	R422	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1
RCR3058	R423	R,Carbon 1/4W 1.8kΩ ±5%	1	1	1
RCR3028	R424	R,Carbon 1/4W 100Ω ±5%	1	1	1
RCR3064	R425	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1
RCR3064	R426	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1
RCR3088	R427	R,Carbon 1/4W 33kΩ ±5%	1	1	1
RCR3036	R428	R,Carbon 1/4W 220Ω ±5%			
RCR3036	R431	R,Carbon 1/4W 220Ω ±5%	1	1	1
RDE0003	RV401	VR, Carbon EVH-YK3325B14	1	1	1
HX8311705			R	R	R
HX8311701			R	R	R
RCR3052	R501	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1
RCR3044	R502	R,Carbon 1/4W 470Ω ±5%		1	1
RCR3056	R503	R,Carbon 1/4W 1.5kΩ ±5%	1	1	1
RCR3084	R504	R,Carbon 1/4W 22kΩ ±5%	1	1	1
RDE0004	RV504	VR,Carbon EVL-S0AA00B53	1	1	1
HX8311711			R	R	R
HX8311704			R	R	R
RME0981	R511	R,Metal 1/2W 1.4kΩ ±1%	1	1	1
RME0979	R512	R,Metal 1/2W 698kΩ	1	1	1
RME0738	R513	R,Metal 1/4W 422kΩ ±1%	1	1	1
RME0732	R514	R,Metal 1/4W 140kΩ ±1%	1	1	1
RME0739	R515	R,Metal 1/4W 69.8kΩ ±1%	1	1	1
RME0728	R516	R,Metal 1/4W 27.4kΩ ±1%	1	1	1
RME0739	R517	R,Metal 1/4W 69.8kΩ ±1%	1	1	1
RMR3733	R521	R,Metal 2W 22kΩ ±5%	1	1	
RMR3732	R521	R,Metal 2W 15kΩ ±5%			1
RCR3078	R522	R,Carbon 1/4W 12kΩ ±5%	1	1	1
RCR3080	R523	R,Carbon 1/4W 15kΩ ±5%	1	1	1
RCR3080	R524	R,Carbon 1/4W 15kΩ ±5%	1	1	1
RCR3084	R525	R,Carbon 1/4W 22kΩ ±5%	1	1	1
RCR3068	R801	R,Carbon 1/4W 4.7kΩ ±5%	1	1	1
RCR3076	R802	R,Carbon 1/4W 10kΩ ±5%	1	1	1
RCR3068	R803	R,Carbon 1/4W 4.7kΩ ±5%		1	1
RCR3054	R804	R,Carbon 1/4W 1.2kΩ ±5%		1	1
RDE0015	RV804	VR,Carbon EVL-S0AA00B23		1	1
HX8311711				R	R
HX8311704				R	R
RCR3072	R805	R,Carbon 1/4W 6.8kΩ ±5%		1	1
RCR3066	R806	R,Carbon 1/4W 3.9kΩ ±5%	1	1	1
RDE0004	RV806	VR,Carbon EVL-S0AA00B53		1	1

Part Code	Symbol	Description	Qty 151F	152F	302F
RCR3066	R807	R,Carbon 1/4W 3.9kΩ ±5%		1	1
RCR3076	R808	R,Carbon 1/4W 10kΩ ±5%	1	1	1
RCR3056	R809	R,Carbon 1/4W 1.5kΩ ±5%	1	1	1
RME0731	R810	R,Metal 1/4W 158kΩ ±1%	1	1	
RME0730	R810	R,Metal 1/4W 127kΩ ±1%			1
RME0730	R811	R,Metal 1/4W 127kΩ ±1%			1
RME0731	R811	R,Metal 1/4W 158kΩ ±1%	1	1	
RCR3056	R812	R,Carbon 1/4W 1.5kΩ ±5%			1
RCR3054	R812	R,Carbon 1/4W 1.2kΩ ±5%	1	1	
RDE0014	RV812	VR,Carbon EVL-S0AA00B13	1	1	1
HX8311711			R	R	R
HX8311704			R	R	R
RCR3074	R813	R,Carbon 1/4W 8.2kΩ ±5%	1	1	1
RCR3060	R814	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RCR3078	R815	R,Carbon 1/4W 12kΩ ±5%	1	1	1
RCR3024	R816	R,Carbon 1/4W 68Ω ±5%	1	1	1
RDE0012	RV816	VR,Carbon EVL-S0AA00B22	1	1	1
HX8311711			R	R	R
HX8311704			R	R	R
RME0729	R821	R,Metal 1/4W 6.19kΩ ±1%	1	1	1
RME0729	R822	R,Metal 1/4W 6.19kΩ ±1%	1	1	1
RCR3207	R823	R,Carbon 1/2W 100kΩ ±5%	1	1	
RCR3203	R823	R,Carbon 1/2W 68kΩ ±5%			1
RCR3207	R824	R,Carbon 1/2W 100kΩ ±5%	1	1	
RCR3203	R824	R,Carbon 1/2W 68kΩ ±5%			1
RCR3064	R825	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1
RCR3064	R826	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1
RMR2853	R827	R,Metal 5W 22kΩ ±5%	1	1	
RMR2851	R827	R,Metal 5W 10kΩ ±5%			1
RMR2851	R828	R,Metal 5W 10kΩ ±5%			1
RMR2853	R828	R,Metal 5W 22kΩ ±5%	1	1	
RCR3038	R829	R,Carbon 1/4W 270Ω ±5%	1	1	1
RCR3038	R830	R,Carbon 1/4W 270Ω ±5%	1	1	1
RCR3092	R901	R,Carbon 1/4W 47kΩ ±5%	1	1	1
RCR3076	R902	R,Carbon 1/4W 10kΩ ±5%	1	1	1
RCR3076	R903	R,Carbon 1/4W 10kΩ ±5%	1	1	1
RCR3096	R904	R,Carbon 1/4W 68kΩ ±5%	1	1	1
RCR3048	R905	R,Carbon 1/4W 680Ω ±5%	1	1	1
RCR3199	R906	R,Carbon 1/2W 47kΩ ±5%	1	1	1
RCR3060	R907	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RMR3733	R908	R,Metal 2W 22kΩ ±5%	1	1	
RMR3731	R908	R,Metal 2W 10kΩ ±5%			1
RCR3052	R909	R,Carbon 1/4W 1.0kΩ ±5%	1	1	
RCR3050	R909	R,Carbon 1/4W 820Ω ±5%			1
RCR3044	R910	R,Carbon 1/4W 470Ω ±5%	1	1	1
RCR3028	R911	R,Carbon 1/4W 100Ω ±5%	1	1	1
RCR3044	R912	R,Carbon 1/4W 470Ω ±5%	1	1	1
RCR3028	R913	R,Carbon 1/4W 100Ω ±5%	1	1	1
SSL0054	S402	SW,Lever SLA224 Non Short	1	1	1
SSL0055	S403	SW,Lever SLA244 Non Short	1	1	1
HX8311684	S501	SW,Rotary S21P3520	1	1	1
HX8311686			R	R	R
HTK0081	TR401	Transistor 2SK304E	1	1	1
HTC0148	TR402	Transistor 2SC458-C-	1	1	1
HTA0105	TR403	Transistor 2SA836D	1	1	1
HTA0105	TR404	Transistor 2SA836D	1	1	1
HTC0664	TR406	Transistor 2SC1907	1	1	1
HTC0664	TR407	Transistor 2SC1907	1	1	1
HTK0011	TR501	Transistor 2SK30AY	1	1	1
HTC0148	TR502	Transistor 2SC458-C-	1	1	1
HTC0148	TR503	Transistor 2SC458-C-	1	1	1
HTC0148	TR801	Transistor 2SC458-C-		1	1
HTA0105	TR802	Transistor 2SA836D	1	1	1

Part Code	Symbol	Description	Qty 151F	152F	302F
HTA0105	TR803	Transistor 2SA836D	1	1	1
HTA0105	TR804	Transistor 2SA836D	1	1	1
HTA0105	TR805	Transistor 2SA836D	1	1	1
HTA0105	TR806	Transistor 2SA836D	1	1	1
HTC0671	TR807	Transistor 2SC1505L	1	1	1
HTC0671	TR808	Transistor 2SC1505L	1	1	1
HTC0148	TR901	Transistor 2SC458-C-	1	1	1
HTC0148	TR902	Transistor 2SC458-C-	1	1	1
HTC0669	TR903	Transistor 2SC2912S	1	1	1
HTC0671	TR904	Transistor 2SC1505L	1	1	1

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Part Code	Symbol	Description	Qty 151F	152F	302F
CEC0175	C320	C,AL Elyc 25V 10μF	1	1	1
CCC1034	C323	C,Ceramic 50V 68 pF ±5%	1	1	
CVE0027	CV323	C,Variable ECV-1ZW40x60			1
CCC1013	C325	C,Ceramic 50V 39 pF ±5%			1
CCC1030	C326	C,Ceramic 50V 10000 pF +80% -20%	1	1	1
CEC0175	C327	C,AL Elyc 25V 10 pF	1	1	1
CVE0027	CV330	C,Variable ECV-1ZW40x60	1	1	1
CCC1004	C331	C,Ceramic 50V 15 pF ±5%			1
CCC1009	C331	C,Ceramic 50V 27 pF ±5%	1	1	
CCD0272	C332	C,Ceramic 500V 1 pF ±0.25pF	1	1	1
CCD0272	C333	C,Ceramic 500V 1 pF ±0.25pF	1	1	1
CEC0175	C334	C,AL Elyc 25V 10μF	1	1	1
CCD0287	C338	C,Ceramic 500V 4700 pF +100-0%	1	1	1
CCD0287	C343	C,Ceramic 500V 4700 pF +100-0%	1	1	1
CCD0287	C344	C,Ceramic 500V 4700 pF +100-0%	1	1	1
CCD0287	C345	C,Ceramic 500V 4700 pF +100-0%	1	1	1
CCD0287	C346	C,Ceramic 500V 4700 pF +100-0%	1	1	1
CCC1002	C350	C,Ceramic 50V 10 pF ±0.5pF	1	1	1
CCD0287	C1034	C,Ceramic 500V 4700 pF ±10%	1	1	1
CEC0219	C1102	C,AL Elyc 250V 4.7μF	1	1	1
HDH0029	D301	Diode HZ5B T-D	1	1	1
HDH0029	D302	Diode HZ5B T-D	1	1	1
HDH0029	D303	Diode HZ5B T-D	1	1	1
HDH0091	D1032	Diode HZ24B			1
HDS0108	D1103	Diode 1S2075 T-D	1	1	1
ELE0084	L336	Coil EL0606R-1R0M			1
ELE0084	L337	Coil EL0606R-1R0M			1
ELE0087	L336	Coil EL0606R-3R3M	1	1	
ELE0087	L337	Coil EL0606R-3R3M	1	1	
JBX0167	P301	Connector 171825-8	1	1	1
JBX0368	P1031	Connector 171825-3	1	1	1
HX116113	PEF-469	PCB	1	1	1
HX8311790			R	R	R
RCR3060	R320	R,Carbon 1/4W 2.2kΩ ±5%			1
RCR3028	R321	R,Carbon 1/4W 100Ω ±5%	1	1	1
RCR3028	R322	R,Carbon 1/4W 100Ω ±5%	1	1	1
RCR3028	R323	R,Carbon 1/4W 100Ω ±5%			1
RCR3028	R324	R,Carbon 1/4W 100Ω ±5%	1	1	1
RCR3004	R325	R,Carbon 1/4W 10Ω ±5%			1
RCR3060	R326	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RCR3060	R327	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RCR3048	R328	R,Carbon 1/4W 680Ω ±5%	1	1	1
RCR3048	R329	R,Carbon 1/4W 680Ω ±5%	1	1	1
RCR3061	R330	R,Carbon 1/4W 2.4kΩ ±5%	1	1	1
RCR3061	R331	R,Carbon 1/4W 2.4kΩ ±5%	1	1	1
RMR3727	R332	R,Metal 1W 33kΩ ±5%	1	1	
RMR3726	R332	R,Metal 1W 22kΩ ±5%			1
RMR3726	R333	R,Metal 1W 22kΩ ±5%			1
RMR3727	R333	R,Metal 1W 33kΩ ±5%	1	1	
RCR3012	R334	R,Carbon 1/4W 22Ω ±5%	1	1	1
RCR3012	R335	R,Carbon 1/4W 22Ω ±5%	1	1	1
RCR3044	R336	R,Carbon 1/4W 470Ω ±5%	1	1	
RCR3036	R336	R,Carbon 1/4W 220Ω ±5%			1
RCR3036	R337	R,Carbon 1/4W 220Ω ±5%			1
RCR3044	R337	R,Carbon 1/4W 470Ω ±5%	1	1	
RCR3199	R338	R,Carbon 1/2W 47kΩ ±5%	1	1	
RCR3195	R338	R,Carbon 1/2W 33kΩ ±5%			1
RMR3728	R339	R,Metal 1W 47kΩ ±5%	1	1	
RCR3195	R339	R,Carbon 1/2W 33kΩ ±5%			1
RCR3195	R340	R,Carbon 1/2W 33kΩ ±5%			1
RMR3728	R340	R,Metal 1W 47kΩ ±5%	1	1	
RCR3012	R341	R,Carbon 1/4W 22Ω ±5%	1	1	1
RCR3012	R342	R,Carbon 1/4W 22Ω ±5%	1	1	1
RCR3060	R343	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RCR3060	R344	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1
RCR3036	R345	R,Carbon 1/4W 220Ω ±5%	1	1	
RCR3034	R345	R,Carbon 1/4W 180Ω ±5%			1
RCR3036	R346	R,Carbon 1/4W 220Ω ±5%	1	1	
RCR3034	R346	R,Carbon 1/4W 180Ω ±5%			1
RCR3028	R350	R,Carbon 1/4W 100Ω ±5%	1	1	1
RCR3100	R1032	R,Carbon 1/4W 100kΩ ±5%			1
RCR3092	R1033	R,Carbon 1/4W 47kΩ ±5%	1	1	1
RCR3088	R1033	R,Carbon 1/4W 33kΩ ±5%			1
RDE0018	RV1033	VR,Carbon EVT-S0AA00B54	1	1	1
HX8311713			R	R	R
HX8311704			1	R	R
RCR3092	R1034	R,Carbon 1/4W 47kΩ ±5%	1	1	
RCR3088	R1034	R,Carbon 1/4W 33kΩ ±5%			1
RDE0029	RV1035	VR,Carbon EVT-S0AA00B25	1	1	1
HX8311713			R	R	R
HX8311704			R	R	R
RCR3036	[illegible]	R,Carbon 1/4W 220Ω ±5%			1
RMR3727	[illegible]	R,Metal 1W 33kΩ ±5%	1	1	
RCR3187	[illegible]	R,Carbon 1/2W 15kΩ ±5%			1
RCR3191	[illegible]	R,Carbon 1/2W 22kΩ ±5%	1	1	
RCR3191	[illegible]	R,Carbon 1/2W 22kΩ ±5%			1
RME0740	[illegible]	R,Metal 1/4W 113kΩ ±1%	1	1	
RME0725	[illegible]	R,Metal 1/4W 88.7kΩ ±1%			1
RME0724	[illegible]	R,Metal 1/4W 20.5kΩ ±1%	1	1	1
HTC0664	[illegible]	Transistor 2SC1907	1	1	1
HTC0664	[illegible]	Transistor 2SC1907	1	1	1
HTC0192	[illegible]	Transistor 2SC641K-C	1	1	
HTC0192	[illegible]	Transistor 2SC641K-C			1
HTC0669	[illegible]	Transistor 2SC2912S	1	1	1
HTC0669	[illegible]	Transistor 2SC2912S	1	1	1

Part Code	Symbol	Description	Qty 151F	152F	302F
HTA0258	TR309	Transistor 2SA1210S	1	1	1
HTA0258	TR310	Transistor 2SA1210S	1	1	1
HTA0099	TR311	Transistor 2SA781K	1	1	1
HTA0099	TR312	Transistor 2SA781K	1	1	1
HTC0671	TR1101	Transistor 2SC1505L	1	1	1
HTC0671	TR1102	Transistor 2SC1505L	1	1	1

PEF-470F,471F PCB

Part Code	Symbol	Description	Qty 151F	152F	302F
RCR3100	R1031	R,Carbon 1/4W 100kΩ ±5%	1	1	1
JSP0001	J1032	Socket PS-085	1	1	1
HX116413	PEF-470	PCB			
HX283858					
HX8311790					
HX116413	PEF-471	PCB			
HX283858					
HX8311790					

PEF-472F PCB

Part Code	Symbol	Description	Qty 151F	152F	302F
CCC1030	C271	Capacitor Ceramic 50V 10000pF	1		
CQA0097	C1202	C,Plastic 50V 10000pF ±10%	1	1	1
CES0033	C1203	C,AL Elyc 25V 100μF	1	1	1
CCC1029	C1204	C,Ceramic 50V 1000pF +80% -20%	1	1	1
IDC0089	IC1201	IC CD 4011 UBE	1	1	1
HX116413	PEF-472	PCB			
HX283858			R	R	R
HX8311790			R	R	R
RCR3104	R271	R,Carbon 1/4W 470kΩ ±5%	1		
RCR3076	R272	R,Carbon 1/4W 10kΩ ±5%	1		
RCR3044	R273	R,Carbon 1/4W 470Ω ±5%	1		
RCR3072	R274	R,Carbon 1/4W 6.8kΩ ±5%	1		
RDE0015	RV273	VR,Carbon EVL-S0AA00B23	1		
HX8311711			R		
HX8311704			R		
HX3142132 -A	RV518	VR,Carbon V16L4GI1NB2K+ 100kΩ	1		
HX3142131 -B	RV518	VR,Carbon V16L4-N20KC B2kΩ		1	1
RCR3050	R518	R,Carbon 1/4W 820Ω ±5%	1	1	1
RCR3028	R519	R,Carbon 1/4W 100Ω ±5%	1	1	1
RDE0004	RV806	RV,Carbon EVL-S0AA00B53	1		

Part Code	Symbol	Description	Qty 151F	152F	302F
HX8311711			R		
HX8311704			R		
RCR3052	R807	R,Carbon 1/4W 1.0kΩ ±5%	1		
RDE0003	RV815	VR,Carbon EVH-YK3325B14	1	1	1
HX8311705			R	R	R
HX8311701			R	R	R
RCR3090	R1201	R,Carbon 1/4W 39kΩ ±5%	1	1	1
RCR3092	R1202	R,Carbon 1/4W 47kΩ ±5%	1	1	1
RCR3080	R1203	R,Carbon 1/4W 15kΩ ±5%	1	1	1
RDE0004	RV1203	VR,Carbon EVL-S0AA00B53	1	1	1
HX8311711			R	R	R
HX8311704			R	R	R
RCR3049	R1204	R,Carbon 1/4W 750Ω ±5%	1	1	1
HTK0081	TR271	Transistor 2SK304E	1		
HTC0148	TR272	Transistor 2SC458-C-	1		

PEF-473F,474F PCB

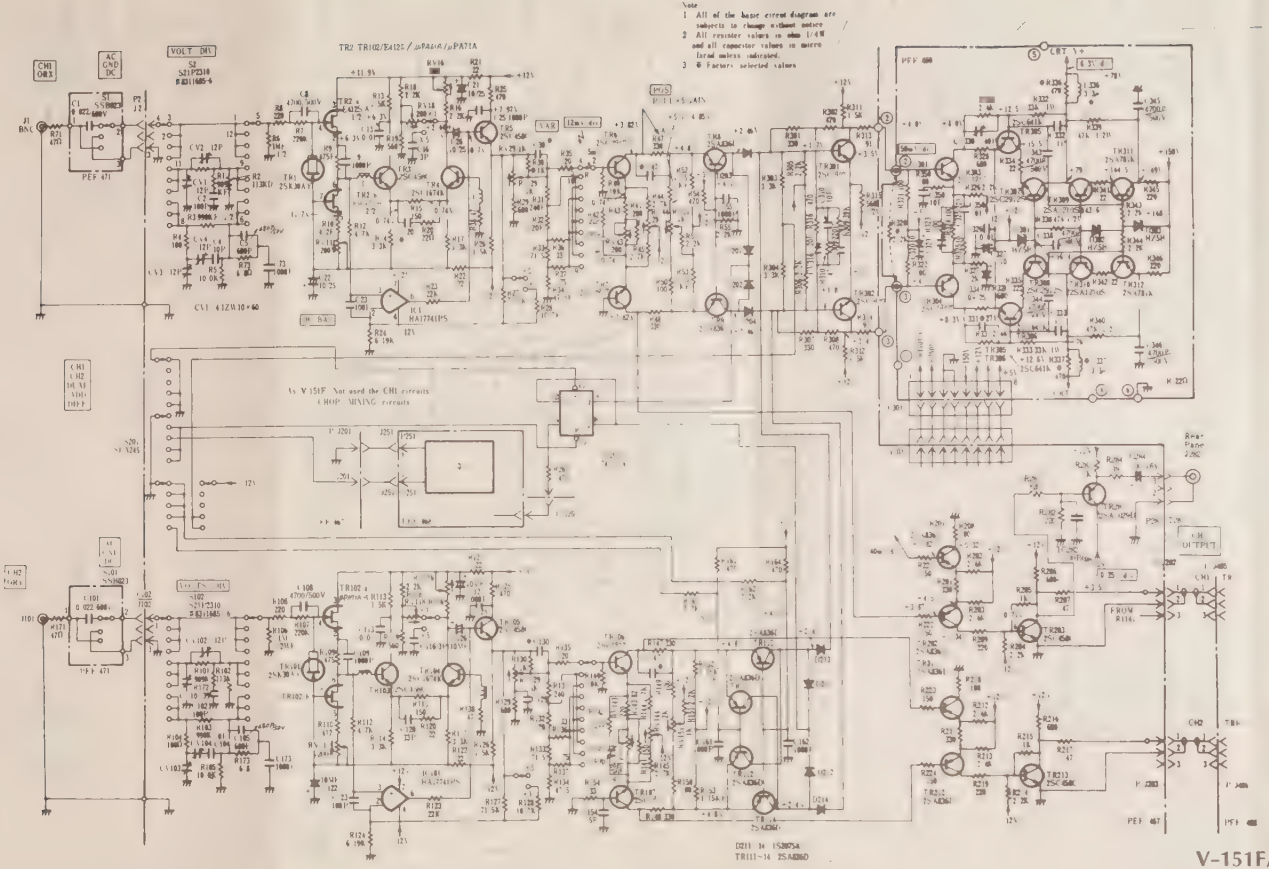
Part Code	Symbol	Description	Qty 151F	152F	302F
CQX0071	C1	C,Plastic 600V 22000pF ±10%		1	1
CQX0071	C101	C,Plastic 600V 22000pF ±10%	1	1	1
HX116413	PEF-473	PCB			
HX283858				R	R
HX8311790				R	R
HX116413	PEF-474	PCB			
HX283858			R	R	R
HX8311790			R	R	R
SSV0042	S1	SW,Slide SSB023 L=9 NS PCB		1	1
SSV0042	S101	SW,Slide SSB023 L=9 NS PCB	1	1	1

CHASSIS

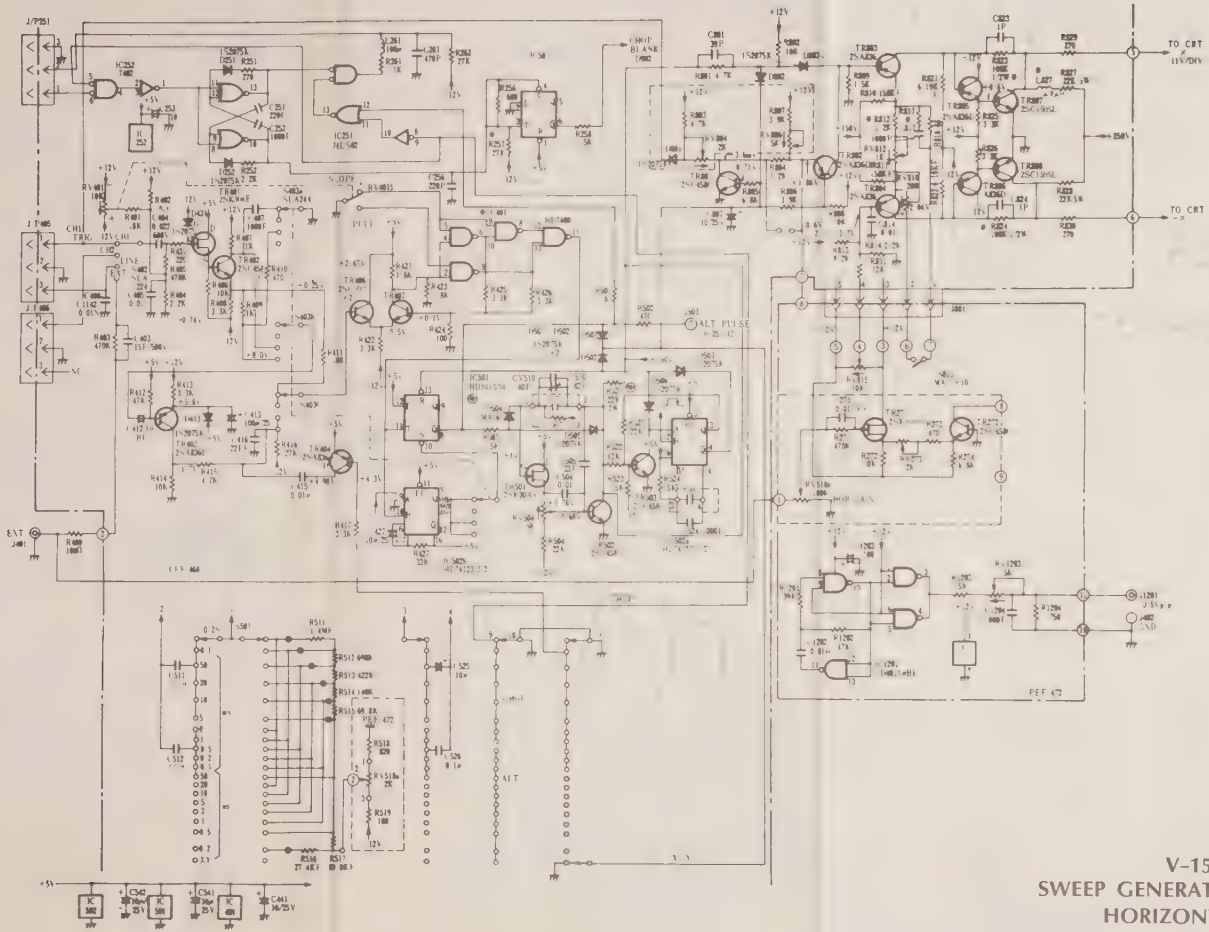
Part Code	Symbol	Description	Qty 151F	152F	302F
HX8311741 -B	DL301	Delay Line CD-3A			1
HDS0408	D1112	Diode SR503D With Mount (RED)	1	1	1
EFG0344	F1101	Fuse MF61NM 1 (1A 250V) JIS			
EFG0352	F1101	Fuse MF61NM 2 (2A 250V) JIS			
JHB0088	J1	Coax. Con BNC071		1	1
HX3142036 -A	J2	Multi. Con J2			1
JHB0088	J101	Coax. Con BNC071			1

Part Code	Symbol	Description		Qty 151F	152F	302F
HX3142036-B	J102	Multi.Con	J102	1	1	1
HX3142036-G	J201-251	Multi.Con	J201		1	1
HX3142036-H	J202-405	Multi.Con	J202		1	1
HX3142036-I	J203-406	Multi.Con	J203	1	1	1
HX3142036-J	J1102	Multi.Con	J1102	1	1	1
HX3142036-K	J301	Multi.Con	J301	1	1	1
JHB0088	J401	Coax.Con	BNC071	1	1	1
JJT0028	J402	Jack	TJ-3020	1	1	1
HX3142036-E	J801	Multi.Con	J801	1	1	1
JHB0088	J901	Coax.Con	BNC071	1	1	1
HX3142036-C	J905	Multi.Con	J905	1	1	1
JBX0449	J1001	Connector	171822-3	1	1	1
JYX0252		Contact	170205-1	2	2	2
JBX0043		Connector	163690-9 (2.5MM)	1	1	1
JYX0059		Contact	163691-1	6	6	6
HX3142036-F	J1002	Multi.Con	J1002	1	1	1
HX3142036-D	J1031	Multi.Con	J1031	1	1	1
ERS0004		HLDR	CB-3	1	1	1
JJC0026	J1102	Connector	CM3 (C170)	1	1	1
HX3142147-I	J1103	Terminal	S-17221 (100/120/220/240V)	1	1	1
HX4114183-A	J1201	Terminal	Black (14V 80mA)	1	1	1
HX8311683	J1026	Coil		1	1	1
DYA0001	P1020	Anode Cap	A451500 32 DIA			1
BBZ0182	P1101	Code Set	VM1165B-1172B 3.0M (J-Type)			
RCR3020	R71	R,Carbon	1/4W 47Ω ±5%		1	1
RCR3020	R171	R,Carbon	1/4W 47Ω ±5%	1	1	1
RCR3028	R400	R,Carbon	1/4W 100Ω ±5%	1	1	1
RDE0028	RV1016	VR,Carbon	EVM-R7GS20B26	1	1	1
HX8311714				R	R	R
RDE0009	RV1026	VR,Carbon	EVH-COAS15B14	1	1	1
HX8311707				R	R	R
HX8311702				R	R	R
HX3142133-A	RV1101	VR,Carbon	V24L5S(U12DV-C) 20KC-10kΩ	1	1	1
HX3169421	T1101	XFMR	For V-151F, 152F, 302F	1	1	1
DPX0019	V1001	CRT	130BTB31	1	1	1
DPX0053	V1001	CRT	130BTB31			
	ERS0004	Cable, B	CB-3			
448932-36		Wire	PEV-AL BRO	0.7	0.7	0.7M
448932-36		Wire	PEV-AL RED	0.4	0.4	0.4M
448932-36		Wire	PEV-AL ORG	0.7	0.7	0.7M
BBA0040		Wire, Vinyl	WL1H12/0.18 YEL	1.2	1.2	1.2M
BBA0139		Wire, Vinyl	WL1H7/0.18 BLU	0.3	0.3	0.3M
BBA0140		Wire, Vinyl	WL1H7/0.18 RED	[illegible]	[illegible]	[illegible]M
BBA0143		Wire, Vinyl	WL1H7/0.18 YEL	[illegible]	[illegible]	[illegible]M
BBA0144		Wire, Vinyl	WL1H7/0.18 BLK	[illegible]	[illegible]	[illegible]M
BBA0147		Wire, Vinyl	WL1H7/0.18 WHT	[illegible]	[illegible]	[illegible]M
BBA0157		Wire, Vinyl	WL1H7/0.18 ORG	[illegible]		
BBA0160		Wire, Vinyl	WL1H7/0.18 BRN	[illegible]	[illegible]	[illegible]M
BBA0161		Wire, Vinyl	WL1H7/0.18 GRY	[illegible]	[illegible]	[illegible]M
BBA0164		Wire, Vinyl	WL1H7/0.18 GRN	[illegible]	[illegible]	[illegible]M
ERL0010			SS-4			[illegible]M

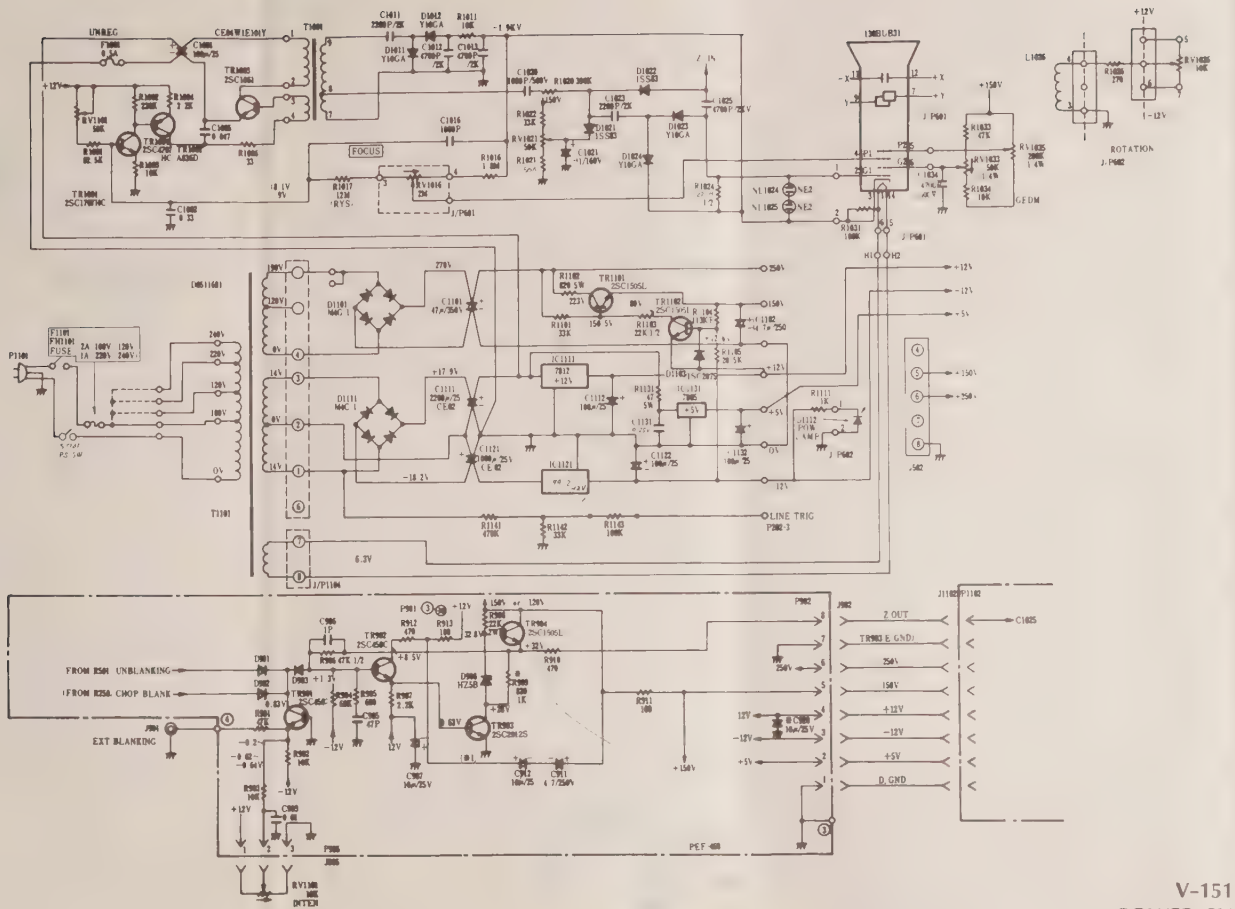
Part Code	Symbol	Description	Qty 151F	152F	302F
HX4124935		HP-5N			2
BBG0004		WL1H7/0.18x2 ORGxBLK	0.3	0.3	M
BSA0031			0.01	0.01	0.01
ERL0002			15	15	15
BSE0001			0.2	0.2	0.2M
BSA0003			0.1	0.1	0.1M
ERA0006			0.1	0.1	0.1M
ERB0010			0.1	0.1	0.1M
HX43196			3	3	3
V0Z0002		G746 200G		0.05	



V-151F/V-152F
VERTICAL SYSTEM
SCHEMATIC DIAGRAM ①



V-151F/V-152F
SWEEP GENERATOR, TRIGGER, CAL &
HORIZONTAL AMPLIFIER
SCHEMATIC DIAGRAM ②

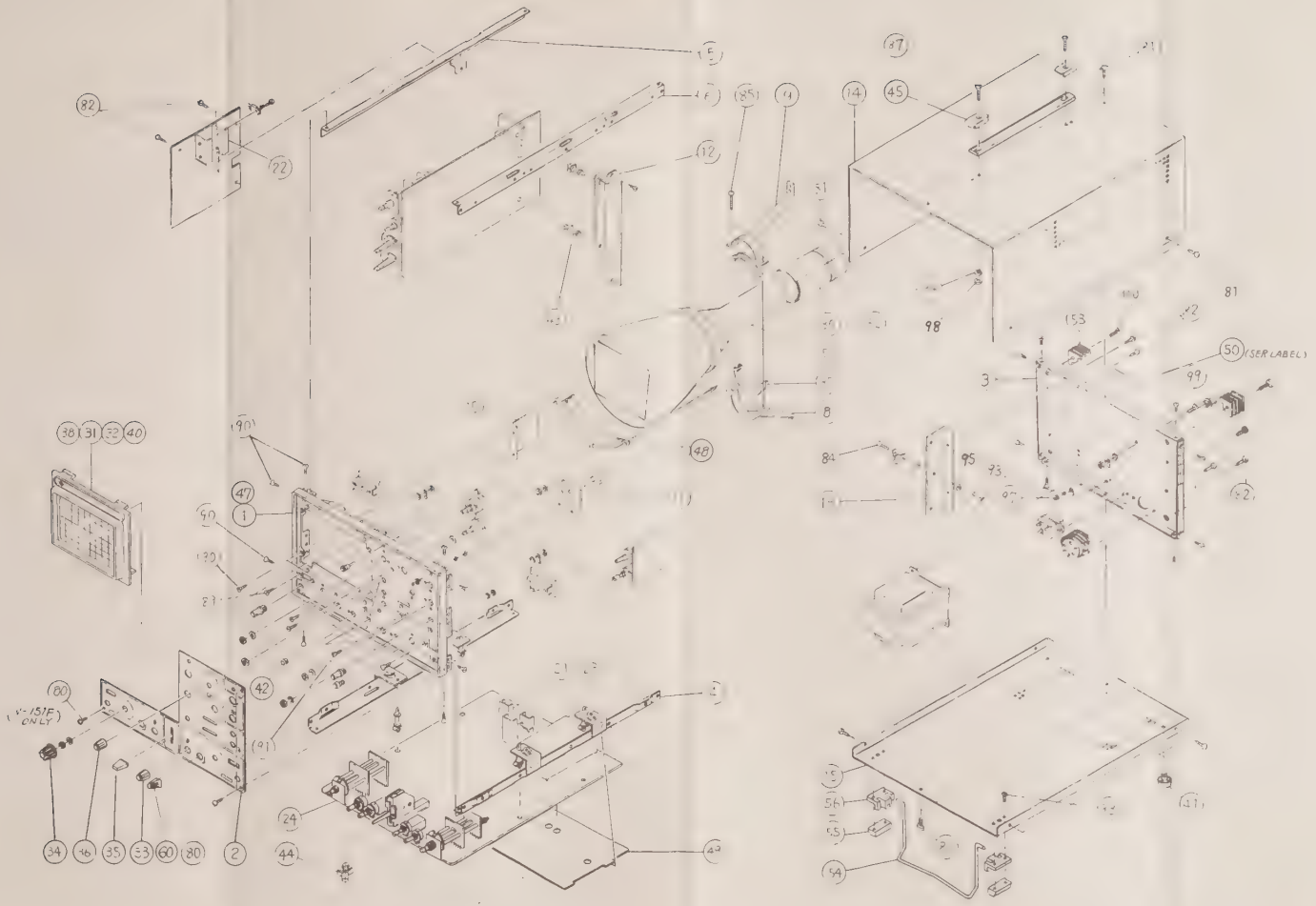


V-151F/V-152F
POWER SUPPLY & Z-AXIS
SCHEMATIC DIAGRAM ③

8. MECHANICAL PARTS LIST AND EXPLODED VIEW

Part Code	Symbol	Description	Qty	Remarks
117459-A	1	Subpanel, front	1	
8316262-B		Cushion	1	
284347-C	2	Panel, front	1	V-151F
284349-C	2	Panel, front	1	V-152F, V-302F
292447-BB	3	Panel, rear	1	
284352-AA	4	Angle	2	
285083-AA	5	Angle	1	
284395-B	6	Angle	1	
3140790-A	7	CRT shield plate	1	
8316262-E		Cushion	1	
3144088-A	8	CRT band	1	V-151F, V-152F
3140791-A		CRT band	1	V302F
3144088-B	9	CRT band	1	V-151F, V-152F
3140791-B		CRT band	1	V-302F
8312139-A	10	Shield plate, Time	1	
8312140-A	11	Bracket, VR	1	
8312141-A	12	Bracket, H board	1	
8318957-A	13	Bracket, L	1	
284357-A	14	Cover	1	
292448-A	15	Cover, bottom	1	
8329719-A	21	Heat sink	6	
8329720-A	22	Heat sink	2	
8381380-A	23	Shield case, HV	1	
8318959-A	24	Earth plate	2	
8316268-A	30	Shield band, CRT	1	V-151F, V-152F
8316268-B	30	Shield band, CRT	1	V-302F
282239	31	Bezel	1	
3147500-A	32	Dial plate	1	
3149321-B	33	Knob, S18	4	V-151F
3149321-B		Knob, S18	5	V-152F, V-302F
3140804-B	34	Knob, S22	2	V-151F
3140804-B		Knob, S22	3	V-152F, V-302F
3149325-B	35	Knob, LSW	2	V-151F
3149325-B		Knob, LSW	3	V-152F, V-152F
3149322-C	36	Knob, S24	1	
3144055-A	37	Rubber	2	V-151F, V-152F
3144055-B	37	Rubber	2	V-302F
8345860-C	38	Name Plate	1	V-151F
8345860-D	38	Name Plate	1	V-152F
8345860-E	38	Name Plate	1	V-302F
XCF0141	40	Clip	2	
3140755-A	41	Foot	2	
ERR0073	42	Bush, B-312-250	1	
8360723-D	43	Support, LCBS-8NS	6	
8360724-B	44	Spacer, PS-4NS	1	
8305589-A	45	Handle	1	
8316262-B	47	Cushion	1	
8316262-E	48	Cushion	1	
8318971-A	49	Plate	1	
8322428-A	51	Rubber	1	V-151F, V-152F
8322428-B		Rubber	1	V-302F
ERL0009	52	Band, SKB-3M	1	V-151F, V-152F
ERL0093		Band, SKB-4M	1	V-302F
3149317-A	53	Foot, rear	4	
8345455-B	54	Stand	1	
8345456-A	55	Holder, stand	2	

Part Code	Symbol	Description	Qty	Remarks
8345457-A	56	Foot, stand	2	
3149321-C	60	Knob S18	2	V-151F
3149321-C	60	Knob S18	3	V-152F, V-302F
XCA6205	80	Screw (M2 x 5)	1	V-151F
XCA1598	81	Screw (M3 x 5)	10	
XCA6308	82	Screw (M3 x 8)	24	V-151F, V-152F
XCA6308	82	Screw (M3 x 8)	25	V-302F
XCA6310	83	Screw (M3 x 10)	4	
XCA6316	84	Screw (M3 x 16)	1	
XCA1797	85	Screw (M3 x 20)	2	
XCA0126	87	Screw (M4 x 16)	2	
XCA0168	89	Screw, flat (M2.6 x 4)	2	V-151F
XCA0168	89	Screw, flat (M2.6 x 4)	4	V-152F, V-302F
XCA7306	90	Screw, flat (M3 x 6)	23	
XCA7308	91	Screw, flat (M3 x 8)	2	V-151F
XCA7308	91	Screw, flat (M3 x 8)	3	V-152F, V-302F
XCA1879	93	Washer, spring (M3)	2	
XCA1881	94	Washer, spring (M4)	2	
XCA1855	95	Washer (M3)	1	
XCA1706	97	Nut (M3)	2	
XCA1707	98	Nut (M4)	2	
XCA6410	99	Screw (M4 x 10)	4	
8340167-C	100	Screw, sems (M4 x 20)	5	



V-151F/V-152F
EXPLODED VIEW

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